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Human Behavior in Disaster: A New Field of Social Research

Issue Editor: Dwight W. Chapman

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Preface

The very existence of disaster research is a grim and significant novelty. We live in the shadow of the sword. For the first time all men—strong and weak, power-hungry and defenseless—can know that war means unavoidable disasters close to home; that, indeed, war is itself a disaster.

Most social scientists, as men of good will, would prefer to concern themselves with how to avoid the disaster of war, not how to sustain a skeleton society in the face of catastrophe. A forthcoming issue of this *Journal* will be devoted to research approaches to these problems of war and peace. But we all know the vast difficulties of marshalling our scientific competence for peace; we must even admit to ourselves that the decision of peace or disaster may not be ours to make.

So it behooves us, if our instincts are healthy, also to do disaster research, or at least to encourage and support it. The present issue, organized by Dwight Chapman in collaboration with the Committee on Disaster Studies of the National Research Council, of which he is a member, describes the work of this Committee and samples its research approaches to the human problems of disaster.

There will be those who feel that committing scientific resources to disaster research involves moral complicity with evil. True enough, habits of thought acquired in the context of *if* may glide imperceptibly into the framework of *when*. Tired of the frying pan, we come to plan on the fire with inappropriate certainty. But this dangerous symptom of our uneasy time is no special stigma of disaster research. On the other side of the balance is not only the hope of knowledge useful for defense, but the healthy exercise of rationality involved in submitting the inconceivably terrible to scientific scrutiny. It ill becomes scientists, the social guardians of rationality, to play the ostrich, and society could ill afford to have them do so.

M. BREWSTER SMITH
General Editor

Introduction

Five years ago it would have been an exaggeration to describe "human behavior under conditions of disaster" as anything more than an embryonic field of research for the social sciences. A very few people were interested in its development; fewer still were contributing empirical studies. The handful of pioneer researchers were only occasionally in touch with one another, and their conceptualizations and methodologies were infrequently shared.

I think we can now say, without hyperbole, that this baby has been born. Like other neonates, it exhibits an entrancing mixture of integrated purpose and vigorous discoordination. Its features are both highly distinguishable and far from mature refinement. Five years from now, it will look different in unpredictable ways.

This field of application for the social sciences arose, of course, from the awesome necessity of preparing ourselves against the threat of military weapons so gigantic in destructiveness that their impact would be in high degree catastrophic. The practical aim of disaster research is to try to develop a social technology which can put limits to the potentially unlimited impact of such weapons. Whatever is achieved in this effort will also make natural, common disasters more endurable. It will also enrich our basic knowledge of the sources of integration and disruption in human beings and their societies.

The present publication—a joint enterprise of the Society for the Psychological Study of Social Issues and of the National Research Council's Committee on Disaster Studies—presents some typical trends in this new area of research.

It begins with an account of the Committee, which was formed at the request of interested Government agencies to stimulate, effect, and integrate research in this field. Mr. Williams' article gives a history of this group and of its lately-begun activities. There is no doubt that its efforts have been in large part responsible for the professional enthusiasm and the give-and-take of ideas which now characterize the social study of disasters. Much research that might otherwise never have been undertaken drew encouragement and support from the Committee and its sponsoring agencies.

A hard and necessary task in any new field of enquiry is to formulate its important dimensions and its basic concepts. This is a job that begins early and ends late—if at all. At any stage, the evolving notions derive from limited

experience and incomplete imagination. Consequently they are tentative and controversial, indispensable in systematizing conclusions and directions for new research at a given period, but liable to sudden contradiction and re-ordering. Dr. Janis' article is an example of the serious efforts which are now being made to build a framework in which empirical findings related to disaster-behavior can generate the greatest scientific significance.

The substantive research on human behavior in disasters which is now in progress is so various that it is difficult to represent within short compass. Three papers in this issue exhibit quite different but typical empirical studies. The first, from the National Opinion Research Center, displays the kind of material which can be developed from interviewing people who have recently undergone the impact of floods, earthquakes, and other adventitious calamities. In this type of research, the conditions of real danger and suffering and of normally complicated community organization offer advantages; the opportunity to design an experiment is, however, minimal. The second paper, from the Human Resources Research Office of the Army, exemplifies the rare opportunity to experiment with attitudinal preparation for a real atomic explosion, however under far safer and more orderly conditions than would obtain in an actual attack. The third paper, by Dr. Hudson, is a sample of the laboratory approach to problems in this field, in which the experimenter manipulates simulated conditions as independent variables in order to investigate dependent variables of personal and social behavior under anxiety, ambiguous perception, and apparent threat. An important conclusion from the three papers as a group is that all the methods of social science—surveying, participant observation, clinical interview, laboratory experiments, and many others—are fruitfully applicable to illuminating the human effects of disastrous situations.

The two papers which conclude this issue, by Dr. Powell and Dr. Killian, were in their original form contributions to a special session of the Committee on Disaster Studies devoted to searching out gaps and new directions in its field of study. They grope expertly for achievements as yet unrealized. To the extent that they overlap, and to the far greater extent that they are each unique, they typify the still-early explorations which the Committee has been concerned to foster.

It is gratifying to this Editor's interest in disaster research to be able to assert that his choice of contributors to this issue of the *Journal* is indefensibly arbitrary, for the number of scientists now adding to our knowledge in this area is impressive. The latest edition of the *Roster of Disaster Personnel* lists 77 persons who are in various degrees active in such research. And it is the frank hope of the Committee in sponsoring this number of the *Journal* that it may attract the cooperation of many other social scientists with research interests pertinent to the analysis of disaster-behavior.

Finally, if the social technology of disaster-control becomes as successful as the grave urgency of our times demands, the fine papers in this publication will seem fumbling or downright mistaken a decade hence. It detracts not one whit from the gratitude and admiration which I feel toward all the Contributors to express my hope that our best efforts may meet the happy fate of rapid obsolescence.

DWIGHT W. CHAPMAN
Issue Editor

Fewer Disasters, Better Studied

Harry B. Williams

Anyone who has been through a disaster—as a victim, a helper, or a research worker—earnestly hopes there will never be another. If his living depends upon studying disasters, he will be happy to find another line of work. If disasters continue to occur, however, they should be studied, and studied better each time.

Social science has been presented with several great challenges since World War II. Understanding the problems of technologic assistance to underdeveloped countries is one of these. Understanding psycho-cultural warfare and the true nature of subversion is another. A third great challenge is to develop a scientific understanding of the human effects and problems of disasters, both present and potential.

One reason why this should be so is clear: American cities can now be attacked with the weapons which have led to dubbing our time the "age of mega-deaths." Such a prospect presents staggering problems—ranging from how to foster the most adaptive possible responses by threatened or stricken populations and how to care for millions of casualties and homeless persons, to the prospect of large-scale social, economic, and demographic reorganizations, if our urban complexes are gutted. Fundamentally, it has become necessary to know how Americans react to disaster and how they deal with it.

Background of the N.R.C. Committee

Studies of the human aspects of disaster began in earnest after World War II, although there had been some useful earlier studies, notable among them Prince's study of the Halifax disaster.[1]

The United States Strategic Bombing Survey had provided a baseline of data on World War II disasters in Europe and Japan.[2] Dr. Irving L. Janis analysed for the RAND Corporation[3] the USSBS data on human behavior during the bombing disasters. Dr. James S. Tyhurst made first-hand investi-

[1] S. H. Prince, *Catastrophe and Social Change*. New York: Columbia University Press, Studies in Political Science, 1920.

[2] United States Strategic Bombing Survey, *Reports*. Washington, D. C.: U. S. Government Publishing Office, 1946-1947.

[3] Irving L. Janis, *Air War and Emotional Stress: Psychological Studies of Bombing and Civil Defense*. New York: McGraw-Hill, 1951.

gations of human behavior in disasters in Canada.[4] Field research on peacetime disasters in the United States was undertaken by the National Opinion Research Center, the University of Maryland, and the University of Oklahoma, for government sponsors. Project East River evaluated a wide range of problems and information in its comprehensive series of reports to three government agencies.[5]

In 1952 the research representatives of the Army, Navy, and Air Force Medical Services requested the National Academy of Sciences-National Research Council to undertake a program of disaster studies. They suggested a national program to advise, stimulate, coordinate, and collate the results of research on a broad inter-disciplinary basis.

In such a request lies the assumption that disaster research may emerge as a substantive inter-disciplinary field of research interest, with a body of theory, data, methods, and competent practitioners. This has been, and continues to be, a major goal of the Committee on Disaster Studies.

The National Academy of Sciences-National Research Council appointed the Committee on Disaster Studies, under the Division of Anthropology and Psychology, in early 1952, with Dr. Carlyle F. Jacobsen as Chairman.[6] This was done after thorough exploration of the disaster research situation by Dr. W. N. Fenton, Executive Secretary of the Division of Anthropology and Psychology. The Committee has established a clearinghouse of disaster studies, through which agencies and research workers receive bibliographic and reference services. It has provided advice to agencies on questions of research and scientific information pertaining to both peacetime and wartime disasters; promoted exchange of information and ideas among investigators, and between investigators and agencies; and participated in some 20 research projects.

The Army, Navy, Air Force, Federal Civil Defense Administration, and more recently the Ford Foundation and the National Institute of Mental Health of the Public Health Service, Department of Health, Education, and

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[4] See, for example, J. S. Tyhurst, "Individual reactions to community disaster: The natural history of psychiatric phenomena," *American Journal of Psychiatry*, 1950-51, *107*, 764-769.

[5] Project East River, *Final Report*. New York: Associated Universities, Inc., 1952. 10 vol. (certain volumes classified).

[6] Members, Committee on Disaster Studies:

Dr. Dwight W. Chapman
Dr. George Dession
Dr. John Gillin, Vice Chairman
Dr. Carlyle F. Jacobsen, Chairman
Dr. Irving L. Janis
Dr. Robert B. Livingston
Dr. Perrin H. Long
Dr. C. M. Louttit, *ex officio*, Chairman, sub-committee on clearinghouse
Dr. John P. Spiegel
Dr. Harry L. Shapiro, *ex officio*, Chairman, Division of Anthropology & Psychology

Welfare, have supported the Committee's activities. Many other government and private agencies have cooperated generously.

Scope of the Committee's Activities

Within an almost limitless range of possibilities, the Committee defined its scope of interest as follows:

> . . . To *understand* disasters as overall phenomena without prejudice to the fields of knowledge and research implied . . . The Committee is interested in the reactions of the American people to disaster situations and in the problem of how available resources, people, equipment and physical facilities are employed in response to disasters. It is the utilization of these resources rather than the equipment and physical facilities *per se* that is to be studied by the Committee.

For example, the Committee has been concerned with the needs and functions of communication in disaster, as a broad human and organizational problem. It has not been concerned with what kinds of equipment will meet these needs or the respective capacities of different technical systems for emergency communication. Others can deal with these problems better. Again, it has been concerned with the organization of emergency medical care, as a community and institutional problem, but not with what methods of treatment are needed for different disaster injuries. The Massachusetts General Hospital has completed a study of emergency medical care in the Massachusetts tornado disaster for the Committee, which identifies some of the variables in this field.

This concern for the broad human aspects has a payoff for all concerned with practical solution of the problem, not just for the social scientist himself. Irving Rosow of Harvard has studied communication in two disasters for the Committee. He goes to the root of the matter when he points out that the addition of more radios and more telephone lines will not necessarily solve the problem of emergency communication, as officials have sometimes felt in their retrospective evaluations of disaster operations.[7] The success of emergency communication depends on the right message being communicated to the right person at the right time. This presupposes availability of technical means of communication, but it presupposes as well a series of human acts which select both information and the person or group to whom it is to be communicated. Tracing out the communication pattern became, Rosow discovered, a job of tracing the emergency organization and authority patterns, as well as the technical communication net.

[7] Irving Rosow, unpublished field reports to the Committee on Disaster Studies.

Concepts for Understanding Disaster

As indicated above, the Committee has felt it important to develop overall understanding of disaster as a phenomenon. This should lead eventually to the construction of models which will specify the major variables and their significant interrelationships and indicate which variables are subject to intervention by planning, training, and organization. A beginning toward mathematization of disaster models has been made by George E. Nicholson, Jr. and Gordon W. Blackwell of the University of North Carolina in a paper prepared for the Committee. The paper, unpublished as yet, is entitled "Game Theory and Defense Against Community Disaster."[8]

Some of the elements of a structural understanding of disaster are emerging. The first such elements to emerge with strong empirical referents involve functional time phases and spatial zones which can be distinguished in different disasters. These phases and zones appear in different forms and combinations depending upon the type of disaster which one is observing.[9] These distinctions have helped in turn to distinguish different types of disasters on a functional basis, rather than only in terms of the kind of agent which causes the disaster.

Substantive concepts and findings of disaster research are discussed in other articles in this special issue of the *Journal*. Suffice it to claim here that these concepts are serving now in at least three ways: (1) Variations in human response and in problems of disaster management and recovery are related to differences in types of disasters, time phases, and spatial zones. These concepts, therefore, provide an immediate tool for analysis and planning. (2) They provide useful methods for ordering data. Based upon the premise of variation stated in "1", data concerning the performance of functional disaster tasks—e.g. rescue, medical care, evacuation, welfare—can be worked through matrices with time and space divisions, giving the data additional meaning and usefulness. (3) They contribute to the development of more systematic theory to guide research and explain its findings.

Strategies of Disaster Research

The Committee has not believed that a systematic theory must precede the initiation of all research, but rather that theory will develop in the interplay of research and interpretation. In a field so complex and so little under-

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[8] See also, John Gillin and George Nicholson, "The security functions of cultural systems," *Social Forces*, 1951, *30*, 179-184.

[9] For an example of descriptions of functional time phases in disaster see John W. Powell, Jeannette F. Rayner and Jacob E. Finesinger, "Responses to disaster in American cultural groups," in *Symposium on Stress* (*16-18 March 1953*). Washington D. C.: Walter Reed Army Medical Center, Army Medical Service Graduate School, 1953, 174-193.

stood, it has felt that exploratory studies should be made in many different disasters, to define the major variables and discover the repetitive phenomena.

The practical value of so-called exploratory or descriptive studies should not be overlooked. There is utility in the findings of trained investigators who discover the actual sequence and pattern of events in a disaster—no easy task—and interpret these findings in terms of their general understanding of human behavior and organization.

There will probably be value for some time to come in general, descriptive studies of disasters. But the time has also come, in the Committee's view, when research can be more rigorously designed to test well-formulated hypotheses.

Disaster research has not been, and should not be limited to field study of actual disasters. In one direction, there are important studies to be made in the areas of demography, urban geography, ecology, social psychology, social and political organization, and economics, using data acquired from other sources. Consider, for example, the data and social science understanding needed by the person who is planning to redistribute and care for millions of citizens, if necessary. The studies of Dr. Fred Iklé and his colleagues at the Bureau of Applied Social Research, Columbia University, are using economic and demographic data in research on potential evacuation of American cities.[10]

In another direction, there are experimental and clinical studies to be made. Dr. Bradford Hudson of Rice Institute has conducted a series of experiments simulating situations of threat and emergency which might occur in disaster. A counterpoint of field studies and other research should be developed, filling gaps in data, testing hypotheses, and establishing reliable principles.

If one believes that so-called basic and applied objectives can be combined in social science research, disaster study seems to support his belief (especially, of course, when the investigator has enough time and resources to pursue his ideas.)

Drs. William H. Form, Gregory Stone, and Charles Westie at Michigan State College are directing study of formal organizations, informal groups, and their interrelationships in the Flint tornado disaster of last year. Disaster agencies usually find that large numbers of volunteers have preceded them into the stricken area and must be integrated into the organized effort. (From the other side, it may be a problem to volunteers who do not wish to be integrated.) In addition to information on this intensely practical subject,

[10] For a similar analysis using World War II data, see Fred Charles Iklé, "The effects of war destruction upon the ecology of cities," *Social Forces*, 1951, *29*, 383-391.

the Michigan State group seeks and is finding deeper knowledge of community structure and processes in the same data.

The social scientist finds that disaster manipulates the variables in large social situations in a way he cannot do purposefully. This provides him an opportunity to study responses to new and unforeseen stimuli and to observe relationships not manifest in the normal society. Dr. Lewis Killian has pointed out the manner in which latent group membership conflicts are revealed in disaster.[11] The Committee on Disaster Studies finds an important part of its purpose and motivation in the fact that this research contributes to fundamental knowledge and theory of human behavior.

It is important to study not only the immediate and more dramatic effects of disaster, but also the long-range effects. A University of Texas group, under the direction of Dr. Harry E. Moore and Mr. Fred R. Crawford, is entering a second year of research on the long-range effects of tornado disaster in Waco and San Angelo, Texas.

This long-range problem becomes even more important when a society or a major part of a society, suffers overwhelming catastrophe. This happened to the people of the southern part of the Netherlands last year. The Institute for Social Research in the Netherlands, under Professor Dr. Sj. Groenman, is completing studies of this catastrophe for the Committee. Professor Groenman's investigators have traced a sequence of psycho-socio-cultural changes from the desperate survival actions of the impact period, through the development of an "emergency community" and a "disaster society," to the gradual resumption of (nearly) normal community life. Their reports are currently in preparation.

Comparative study of disasters in different societies should be illuminating. A Committee team, headed by Dr. John P. Spiegel, a Committee member, and composed of both American and British members, studied last year's flood in England. It was concerned, among other things, with observing governmental and organizational differences in the way the English handle such situations.

A major problem, an historic problem, facing American cities is how to protect populations against mega-death weapons. Governor Val Peterson, Federal Civil Defense Administrator, has said there are three alternatives—dig, die, or get out. If digging deep enough and big enough is economically unfeasible, as so far seems to be the case, the only acceptable alternative, according to Peterson, is to disperse populations from target areas upon receipt of adequate warning.[12]

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[11] Lewis M. Killian, "The significance of multiple-group memberships in disaster," *American Journal of Sociology*, 1952, *57*, 309-314.

[12] Federal Civil Defense Administration, Press Information Release Number 400. Washington D. C.: May 8, 1954.

Several cities have held exercises for tactical dispersal of population. The Committee sent a team into one of these—Operation Walkout in Spokane, Washington—to see whether there are problems which can be researched in test exercises and to recommend appropriate research methods. Further observations have been made in Operation Rideout in Bremerton and Operation Scat in Mobile. Civil defense test exercises may become an important research laboratory.

Other Committee Activities

These observations of dispersal exercises were organized at the request of the Federal Civil Defense Administration and this illustrates another side of the Committee's work. It undertakes specific, spot jobs of investigation to secure information of immediate practical importance to sponsoring agencies. In addition, it provides or secures comments on documents, such as training manuals, and prepares comment upon questions of importance to these agencies.

The clearinghouse of disaster studies has assisted many agencies, research groups, and individuals through reference services and preparation of bibliographies. A basic core for this service is provided by a 10,000-item bibliography on human behavior in extreme situations, prepared for the Committee by Dr. Anthony F. C. Wallace of the University of Pennsylvania. This bibliography is being constantly enlarged.

The clearinghouse, a Disaster Research *Newsletter,* meetings, conferences, personal contacts, and other means are continually employed to help stimulate communication among investigators and between investigators and agencies. The Committee thus seeks to provoke interest in disaster research, promote general improvement of ideas and methodology, and keep the research findings flowing to the agencies which have need to use them.

By all these means, the Committee hopes to serve a critical human need and make a long-range contribution to the development of a new and significant field of research—the human aspects of disaster. The measure of its success will be the degree to which it continues to secure the interest and cooperation of scientists.

Problems of Theory in the Analysis of Stress Behavior

Irving L. Janis

The Recognized Need for Systematic Research

Whenever social scientists address themselves to the scientific problems of studying community disasters, there is one general notion that is almost certain to be emphasized. It is usually expressed in terms of orienting research toward working out a "general theory of disaster" or developing a consistent "conceptual schema," or constructing "comprehensive behavioral models." What the point essentially boils down to is this: there is an obvious need for general theoretical categories and constructs that will help to delineate central problems of disaster behavior that should be investigated.

It is noteworthy that despite protracted discussions of this need in numerous scientific conferences held during the past decade, very little progress has been made. Productive research workers and dignitaries representing the various social science disciplines have repeatedly been brought together to discuss research on the human aspects of disaster. Usually the participants are keenly aware of the grave importance of such research, particularly when the conference has been arranged at the behest of military or government officials who feel appalled by forecasts of the catastrophic potentialities of A-bombs, H-bombs and other new weapons.

After attending several such conferences, one begins to notice that the content of the discussion follows a rather predictable pattern. First, there is likely to be general agreement among the participants that applied research which tries to answer purely practical questions ought to be given less priority in the future than more basic research which aims at understanding the general principles and conditions of disaster responses. Everyone is likely to approve of the notion that this goal can be furthered by carrying out well planned field studies in communities that are stricken by earthquakes, floods, tornadoes or other large-scale disasters.

On this subject, one hears some candid comments from those conferees who are familiar with the existing field data. They usually say that investigators are no longer justified in going into disaster areas simply to see what

kind of behavior goes on, that a great deal of descriptive information is already available on the varieties and range of disaster reactions, and that now we ought to concentrate on finding out why certain effects occur. A resolution is then forthcoming to the effect that from now on field research should concentrate on well-defined problems and hypotheses that will orient the observations toward finding causal factors. At this point, the conferees begin to talk about the way in which the definition, selection, and appraisal of research problems could be facilitated by developing sound theoretical categories which will highlight the significant variables. Finally, someone will speak, more or less eloquently, to the point that no one discipline can embrace more than a small sector of the human aspects of a large scale disaster and that in order to arrive at a comprehensive theoretical framework we shall ultimately have to use a thoroughly interdisciplinary approach in which the conventional subdivisions of the social sciences are more or less ignored.

Perhaps it is out of a combination of rational conviction and polite recognition of the presence of academic colleagues from a number of different university departments that this final notion is not only hastily approved but is also often taken to imply that a comprehensive theory can somehow readily be produced if only a properly constituted team will get down to work on it. In any case, once a consensus is reached concerning the future value of an interdisciplinary approach, the conferees seem to feel a sense of closure, and the conference moves rapidly toward adjournment.

Thus, what mainly comes out of such conferences is general agreement that field research on the human aspects of disaster should be encouraged, that such research should be directed toward testing general hypotheses and that the hypotheses ought to be grounded in social science theory.

As a conferee who has whole-heartedly participated on a number of occasions in arriving at just such a consensus, I have begun to wonder if perhaps these conferences mainly serve a ceremonial function. It seems that despite our sincere and emphatically worded resolutions, there continue to be rather large gaps and chasms in those places where our disaster theory is supposed to be.

It is true that in recent years a number of theoretical contributions have been made which may help to illuminate one or another aspect of disaster behavior. Nevertheless, anyone familiar with the recent empirical literature in this field will probably agree that theory is lagging far behind the rapidly accumulating body of descriptive facts. As yet little advance has been made in the direction of developing any kind of theoretical framework that systematically covers the effects that disasters are known to have on individuals, organizations, and communities. Field studies of large scale disaster have

received little or no impetus toward transforming their operations from a hit or miss "fishing expedition" into hypothesis-oriented research. In fact, there is still relatively little field research that amounts to much more than a somewhat sophisticated form of journalistic reportage supplemented by a few quantitative data showing the percentage of interviewees who made various statements about what they saw and how they felt and acted during the disaster.

The "Disasterology" Myth

Perhaps it is useful to raise the question as to why there continues to be a relative dearth of theoretical formulations which generate testable hypotheses despite a relative abundance of well-trained social scientists who agree that such formulations should be given high priority? One source of inhibition, I suspect, is that many of those who are qualified to work on theoretical aspects of disaster research have an exaggeratedly high level of aspiration and cannot easily escape the discouraging anticipation that one's attempts will fail to measure up to the mark. In part this may stem from a somewhat distorted conception of the need for a multi-disciplinary approach. The widespread recognition of this need seems to have contributed to the expectation that anyone who is working on theoretical aspects of disaster behavior ought to try to integrate the facts, concepts and theoretical models stemming from all of the relevant disciplines. Somehow the notion seems to have grown up that the field of disaster research offers a touchstone to a truly interdisciplinary social science and that we are actually on the threshold of a major theoretical breakthrough.

At several conferences where this inspirational notion seemed to be in the air, I have noticed that it quickly evaporated as soon as any question was raised as to the actual content of disaster theory. As the various specialists in the human sciences talk about the way in which disaster research ties in with their own theoretical interests, the myth that we are about to witness the birth of a comprehensive socio-politico-psychological science of disasterology is quickly replaced by the sober realization that we are in the presence of a large number of uncoordinated inquiries concerning the disparate effects of a complex set of unusual stresses on individuals, families, informal groups, social classes, organized communities, political and economic hierarchies—inquiries that we permit ourselves to package together mainly because they all have something to do with practical social problems which arise at approximately the same time in localities where a tornado or bombing or some other disruptive force has destroyed many people and buildings.

Consider, for example, a sociologist whose scientific curiosity is stimulated by instances where a minority ethnic group does not respond to official warnings and evacuation directives, despite the fact that most of them heard

and understood the official messages issued via the local radio stations. Perhaps the sociologist's study of such instances leads him to the discovery that practically all recommendations from outside authorities, including even emergency messages, tend to go unheeded by this group unless there are certain signs of explicit endorsement on the part of their local leaders. The formulation of theoretical propositions pertaining to this aspect of disaster behavior might require an analysis of pre-established group norms, leadership roles, and patterns of intragroup communication. Such an analysis would certainly take account of numerous non-disaster phenomena—for instance, the way these same people respond to election campaigns, to Community Chest and Savings Bond drives, and to numerous other authoritative appeals or demands that are issued through the mass media and through the special channels of communication which reach the members of this group.

A political scientist, on the other hand, may have a keen theoretical interest in certain phenomena which cut across an entirely different sector of leadership problems within both disaster and non-disaster situations. Perhaps his special concern has to do with the way in which an administrative hierarchy reacts and readjusts to the loss of certain key leaders who may suddenly abandon a critical power position as a result of injury in a disaster, accidental death, acceptance of a new leadership role in another locale, or any of a dozen other different causes. The theoretical concepts that are brought to bear on this problem might help to explain why certain sorts of decisions are made promptly and why other decisions are left pending during the administrative crisis that occurs when a certain type of organizational structure must continue to operate despite the loss of a top level leader.

One could hardly expect the same set of concepts to have any particular application to the sort of leadership problems with which a social psychologist is concerned when he studies the emergence of spontaneous neighborhood leaders who temporarily direct the rescue and relief activities of disaster survivors. Nor would an adequate theory of emergent leadership necessarily be of direct use to the psychiatrist or clinical psychologist who is trying to work out theoretical assumptions that will help us to understand the differences in personality make-up between those civic leaders who are likely to recover rapidly from harrowing danger experiences and those who are apt to develop chronic traumatic neuroses.

It is certainly valuable to take an occasional comprehensive look at the ramified effects of large scale disasters for the special purpose of trying to discern hitherto unnoticed interrelationships. But we should realize that many of the theoretical issues and hypotheses considered under the general heading of disaster research cannot be expected to hang together in the sense that they will be illuminated by a common set of explanatory concepts and principles. It seems to me that we must resign ourselves to a rather piecemeal de-

velopment of general hypotheses and theoretical assumptions. We must be content with any isolated bits of explanatory theory—"miniature" theories as they are sometimes called—which increase our understanding in depth of one or another limited aspect of disaster behavior. Moreover, it would be unrealistic to assume that theories pertaining to disaster phenomena are somehow going to push far ahead of our present social science knowledge. Rather, we must expect the theoretical developments in disaster research to grow directly out of the current theoretical concepts and hypotheses with which research workers in each of the various disciplines are preoccupied.

Contemplation of the messianic hope for an Einsteinian type of general field theory—to integrate major propositions and tested "miniature" theories from all the various human sciences—should not lull us into overlooking the cruel fact that right now there are not very many such verified hypotheses waiting around to be integrated with each other. The successful use of an inter-disciplinary approach will probably often be confined to instances where the same or overlapping behavioral phenomena are being investigated from somewhat different standpoints by research workers from bordering disciplines. For such phenomena, more complete explanatory propositions than are currently available might emerge from deliberate attempts at theoretical cross-fertilization through a careful examination of the similarities and differences in the explanatory concepts used by specialists who approach the common problem with somewhat different frames of reference. But there are undoubtedly also many important theoretical tasks which will require a more or less intra-disciplinary approach in order to increase our understanding of certain of the psychological, sociological, economic, or political effects of community disasters.

Psychological Research on Disaster Behavior

Having renounced the high ambition of trying to work out a sweepingly comprehensive theory and having also resolved to ignore the potential sins of intradisciplinarianism, the writer now feels much more comfortable about revealing the limited scope of the theoretical problems which occupy his interest. Like many other psychologists, the writer is inclined to view disaster research as a source of valuable observations on the way in which people cope with extreme situations and as an especially promising site for studying the strengths and weaknesses of the human personality which determine adaptive and maladaptive reactions to stress. Of particular importance is the opportunity to supplement laboratory and clinical observations on stress behavior with studies of large numbers of persons who display one or another form of temporary emergency reaction which deviates from their normal behavior patterns. These emergency reactions are commonly referred to by such terms as personal disorganization, impulsive emergency action, emotional stress, panic, and demoralization.

It should be noted that psychological phenomena of this type can also be studied in a variety of extreme situations other than large-scale physical disasters—in financial depressions where people face extreme economic insecurity; in personal disasters such as those involving loss of health, status, prestige, or the breaking of affectionate ties; in emotionally traumatic accidents where a person undergoes a narrow escape from death; in concentration camps where men are subjected to severe deprivations or are constantly threatened with punishment and torture.

Insofar as the central problems of psychological analysis involve isolating the causal factors which account for the way people react to threat or danger stimuli, one can expect that the most crucial tests of general propositions will require controlled experiments in which basic determinants derived from theoretical analysis can be varied systematically. Probably the most cogent experimental evidence will come from those studies in which the subjects are exposed to actual conditions of threat or danger, such as can be found in any large hospital or clinic where people are subjected to distressing medical and dental treatments. Although plenty of practical difficulties would have to be overcome, there are no insurmountable obstacles to prevent at least some of the psychological research carried out in community disasters from being designed as controlled experiments. For instance, by comparing the stress behavior of an experimental group that had been given prior training, information or warnings with that of an equivalent control group that had not, it would be possible to obtain fairly precise information on cause-and-effect relationships.

In general, the theorist who is concerned primarily with psychological aspects of stress behavior will be inclined to examine community disasters from the standpoint of specifying the stresses to which people are subjected and delineating the various types of emergency responses which these stresses produce. Most of the stresses can be viewed as arising in three major types of danger situations which characterize every large-scale disaster:

1) *Threat* situations in which people perceive objective signs of impending danger or receive explicit warnings that some kind of danger might be approaching, at a time when the immediate environment is still free from the physical impact of the danger;

2) *Danger impact* situations in which people are actually confronted with physical danger in their immediate environment such that one's chances of escaping injury or death are at least partly contingent upon the speed and efficiency of one's protective actions.

3) *Danger victimization* situations, usually occurring immediately after the actual impact of the danger has subsided or terminated, in which people

perceive the variety and magnitude of the losses sustained by themselves and by others with whom they are emotionally identified—destruction of one's home, bereavement, mutilation, etc. When these situations occur in community disasters, the emotional effects of perceiving one's personal losses are often complicated by the occurrence of new threats to the community, particularly those involving impending deprivations—e.g., anticipation of unrelieved hunger, inadequate shelter, health hazards.

One of the major tasks of psychological theory, then, is to analyze the three types of danger situations with respect to describing the causal factors or determinants that account for the predominance of one or another type of reaction.

Patterns of Emotional Behavior

If theoretical analysis is to be oriented toward helping us arrive at hypotheses concerning causal factors in stress behavior, a logical first step in the inquiry would be to raise the question: what are the dominant reactions that need to be accounted for?

Perhaps the most useful way to begin is to classify the clinical varities of emotional behavior that have been most frequently noted in studies of the way people react when exposed to wartime bombing attacks, large-scale natural disasters, and a variety of personal disasters in which individuals undergo threats of injury, near-miss accidents, or some form of profound personal loss. Tentatively, we can single out at least five different reaction patterns which have been frequently described as typical emotional responses to danger:

1. *Apprehensive avoidance*: This form of reaction is perhaps the most common of all emergency behavior in situations where danger is perceived to be rapidly approaching or actually at hand. The pattern includes the usual physiological, motor and subjective symptoms of acute fear accompanied by overt actions that are oriented toward escaping from the apparent locus of the danger. Long after the objective dangers have subsided, however, some persons continue to display intense fear, flight tendencies, or a "jittery" alertness to minor signs of threats that are ordinarily disregarded.

2. *Stunned immobility*: This is usually a reaction of relatively short duration during and immediately following a sudden experience of danger impact. The outstanding features are the relative absence of both motor and mental activity coupled with some degree of disorientation. Usually the acute "freezing" reaction subsides after a few minutes, but sometimes people wander about for hours in a distracted, dazed state that resembles sleep walking.

3. *Apathy and depression*: In the wake of practically every large-scale disaster there seems to be a widespread reaction of lethargy and pessimism, especially among those individuals who experience the traumatic impact of the danger or who are most severely victimized. Outstanding symptoms are depressive mood and lethargy, characterized by abnormally low level of energy output, absence of initiative in performing any kind of work, lack of interest in normal social activities, constriction of attention, and so on. Sometimes the overall reaction corresponds to what psychiatrists describe as a mild reactive depression. Although relatively few suicides occur and suicidal thoughts do not seem to be very prevalent, depressive attitudes are frequently expressed by those who show a marked apathy reaction (e.g., "What's the use of bothering about anything anymore?").

4. *Docile dependency*: Without necessarily being lethargic or depressed, many disaster victims are apt to show an unusual lack of independent action, coupled with a marked tendency to cling to authoritative persons and to become more or less passive followers. These tendencies are particularly noticeable during the period when disaster victims first become aware of their losses and throughout the early phases of community recovery, when the help of every able-bodied person is needed for rescue and relief work. In extreme form, the reaction pattern consists of almost automatic obedience to the demands of persons in leadership roles, coupled with a child-like seeking for attention and direction from others. Essentially the same tendencies seem to be present in milder forms among those who simply wait around until someone tells them what to do. Without direct encouragement from leaders, people in this emotional state carry out assigned tasks in an almost automatic, perfunctory way, without seeking out the information they need to perform the task correctly. Sometimes their emotional docility is such that they will blindly follow a directive that is obviously inappropriate or mistaken. One of the important social consequences of the docile dependency reaction is that it greatly reduces the chances that administrative errors can be rapidly noted and corrected through employee's suggestions and complaints and other forms of feedback that normally can be counted on when gross errors are made.

5. *Aggressive irritability*: Symptoms of aggression become highly visible among a population that is recovering from a disaster, particularly after the most urgent rescue and relief operations are over. The readiness to give vent to angry resentment, and heated condemnation, particularly of local officials, is perhaps the most widely noted manifestation. More subtle expressions of aggressive irritability may take the form of deliberate non-compliance with official regulations, a high degree of sensitivity to possible slights or inequalities in the distribution of scarce supplies, and a suspicious unfriendly attitude toward "outsiders." The dominant emotional mood often seems to involve a sort of self-protective withdrawal: "I've been through hell and

from now on I intend to watch out strictly for number one—for me and mine."

For each of the five reaction patterns, marked individual differences have been observed. Some persons show a predominance of only one type with very little tendency to display any of the others. Nevertheless, it should be borne in mind that these various reaction patterns are not mutually exclusive; the same persons may show several of the reactions at different stages or time periods during a danger episode. Occasionally the same individual will show all five reactions in a definite sequence, the first during the brief period of maximal threat, the second during the period of danger impact, the third and fourth shortly after the obvious signs of danger have disappeared, and the last during the subsequent post-danger recovery period.

All five patterns have this in common: irrespective of the particular actions that are taken and the subjective feelings that accompany them, there is some degree of loss in mental efficiency. Depending upon how intense the reaction is, a variety of "ego functions" will be impaired to a greater or lesser degree. Each of the reaction patterns can at least temporarily interfere with the person's ability to perceive reality correctly, to appraise the safe and dangerous features of his environment, to plan realistically for the future, to control one's socially unacceptable impulses, to take account of the consequences of alternative courses of action, and so on. From the standpoint of the economic and social welfare of the community, a high incidence of sustained emotional reactions of any one of the five types would constitute a serious problem especially because of the resulting inefficiency in rescue and relief activities and the decline in overall work productivity.

The Analysis of Determinants

Having briefly delineated a number of dominant emotional patterns, we are now able to describe more specifically the kinds of research problems which require theoretical analysis. For the present, one of the main tasks is that of formulating hypotheses about the conditions under which each of the various types of emotional reactions occurs, specifying the determinants which increase (or decrease) the intensity and duration of the reaction.

One set of determinants to be considered involves the particular characteristics of the danger stimuli which are perceived and experienced by the individual. In general, the available evidence shows that the most severe and prolonged emotional reactions occur among those persons who are subjected to the highest degree of personal involvement in danger—for example those who are knocked down by the blast of an explosion or who barely escape being killed in a collapsing building. (3,5,9,13,15) But we still need to know much more about the specific ways in which various types of near-miss experiences give rise to temporary and prolonged emotional dis-

turbance and create chronic traumatic neuroses. Among the major exposure variables which warrant detailed investigation both through experimental laboratory work and field studies, are the following: 1. Degree of warning and alertness (e.g., time interval between warning signals and exposure to danger; activity in progress at the onset of danger.) 2. Degree of injury inflicted by danger stimuli (e.g., amount of pain, perceived severity of the injury; part of the body incapacited.) 3. Perceptible routes of escape (e.g., perceived barriers to successful flight from danger stimuli; signs of entrapment.) 4. Availability of rescue and aid (e.g., time interval between onset of injury, entrapment or suffering and the arrival of rescue personnel.)

Direct personal involvement may also take the form of the loss or the threatened loss of emotionally cathected persons or objects; for instance, the death of a parent, injury or illness among members of the family, or total destruction of the home. Obviously, the various forms of victimization will require detailed comparative investigation.

Still another important set of situational determinants has to do with the social context of the danger situation. The intensity of emotional reactions will depend to some extent upon whether or not one is surrounded by one's family or by the members of some other psychologically *protective group*—irrespective of whether the presence of these other people actually does decrease one's own chances of survival. Similarly the mere knowledge that trusted *leaders* are somewhere in the neighborhood or will be in a position to mitigate impending dangers may have a markedly dampening effect upon emotional excitement. The reassuring (or non-reassuring) *official communications* which emanate from authority figures and the *informal communications* from other sources—including *rumors* spread by fellow disaster victims—can have a strong influence on increasing or decreasing emotional tension.

Thus, on the basis of the existing research literature, we are able to single out a number of important sets of *situational* determinants which are known to have some effect on emotional reactions, but whose causal role is by no means fully understood at present. On the same basis, there are also numerous categories of *predispositional* determinants to be taken into account. These would include such factors as: 1) previously established ideologies and attitudes concerning the divine or natural causes of disasters; 2) previously formed expectations concerning the ways in which danger situations can be averted or mitigated; 3) self-conception of one's social role in the emergency situation; 4) degree of identification or affiliation with primary groups that are threatened by the danger; 5) social status with respect to chances of receiving aid, relief, and preferential treatment; 6) amount of prior training in relevant protective strategies and tactics for dealing with the danger situation; 7) personality characteristics, such as strength of dependency needs and chronic level of anxiety with respect to body integrity.

We are already at the stage where detailed hypotheses can be formulated concerning the way that these and other predispositional characteristics may be related to observable individual differences in the form and magnitude of emotional responses among people who are exposed to roughly the same kind of situational stress.

Use of Theoretical Constructs

Research on the influence of situational and predispositional factors can be viewed as providing answers to two main questions. First, at times when people are exposed to threats or to actual danger, what *events or circumstances* make them more likely to react one way rather than another? Second, when circumstances are such that a sizable percentage of exposed individuals do react in a particular way, *who* are the ones that are especially likely to show the reaction? When working on questions of this sort it is sometimes helpful to speculate about what must be going on in a person's mind that would explain why certain circumstances and certain predisposing characteristics make him behave the way he does. As is generally recognized, such speculations can sometimes furnish the main ingredients of an explanatory theory—provided, of course, that the concepts are properly refined by means of logically coherent assumptions and definitions from which unambiguous predictions can be made concerning observable behavioral events. Thus, we may expect that some of the current speculations about the way people perceive, think, imagine, and feel during catastrophes may furnish the substance of theoretical constructs. Such constructs could ultimately form the nuclei for constructing miniature theories concerning perceptual, cognitive or motivational processes which are assumed to mediate various observable relationships.

Already a number of theoretical advances seem to be in the making which ought to help explain emotional behavior under stress conditions. For instance, some aspects of reactions to external danger signals and to fear-arousing communications seem to be at least partly accounted for by propositions derived from behavior-theory postulates which assume that fear or anxiety operates as a learned drive. Central notions in this theory are that a) the intense emotional state aroused by danger cues will motivate varied escape behavior—including thinking, planning, fantasy and other symbolic reactions as well as overt activity, and b) whatever response terminates or greatly reduces the intensity of the emotional state will be reinforced and hence will tend to become the dominant reaction. These assumptions seem to offer an explanation for certain kinds of adaptive and maladaptive behavior in response to fear stimuli. (Cf. Dollard and Miller[2], pp. 62-168, and Hovland, Janis and Kelley[4], pp. 56-98).

Another recent line of theoretical development derives from psychoanalytic propositions concerning denial, isolation, and related mechanisms

of defense. Of particular relevance to disaster behavior are those psychodynamic hypotheses concerning: a) how people defend themselves against anxiety in the face of impending danger through reliance upon group identification and beliefs of personal invulnerability, and b) the way relatively minor events during actual danger episodes produce a disproportionately intense emotional impact by shattering the individual's defensive beliefs. (Cf. Grinker and Spiegel[3], pp. 130ff., Rado[12], Schmideberg[13]).

Perhaps it is not premature to begin searching for some new sources of hypothetical constructs and theoretical assumptions concerning the nature of human stress behavior so as to supplement those already in use. In so doing, however, we are apt to overlook or discard some of the most promising theoretical leads if we always live up to that special kind of ambition which demands that a theoretical analysis should employ only those constructs and postulates which have already been sharply formulated, are already in the process of being vigorously tested, and, in brief, are scientifically quite respectable. When working on relatively unexplored problems of human behavior, we ought to allow ourselves to work with dirty hands for a while provided that we sincerely promise our scientific conscience to try to work out operational definitions and otherwise clean up the mess afterwards if it does turn out that relaxing our standards of purity enables us to get our hands on some real pay dirt.

There are numerous theoretical concepts which, although somewhat vaguely formulated in discussions of phenomena quite remote from disaster behavior, may nevertheless furnish the basis for important theoretical advances. For instance, concepts such as "reference groups," "internalization of role assignments," and "emotional regression" ought to be carefully examined as potential theoretical leads for explaining the effects of specified determinants and for tying together seemingly unrelated reactions to environmental stress.

In addition to modifying our quality ambitions, we shall also have to curtail our quantity ambitions. Here we return to the theme stated at the outset of this paper: we shall probably end up with very little productive theory and research if, in appraising theoretical constructs, we insist upon using as one of our main criteria the total number of different propositions to which the construct could potentially be applicable. Consider, for example, the conflict-theory postulates which psychologists have worked out on *approach-avoidance* and *avoidance-avoidance conflicts*. Although developed mainly on the basis of controlled experiments in which animals and human subjects have been exposed to relatively simple dilemmas, the theory is rapidly being extended to more complicated aspects of human motivational conflicts. Such extentions may prove to be of considerable relevance for explaining the way a person behaves when disaster circumstances suddenly

place him in an emotionally disturbing conflict between his anxious desire, as a father, to search for his family and his sense of duty, as a conscientious local official, to begin immediately to carry out his disaster control assignment. Similarly, the way in which a person conforms to neighbors' urgent demands for help as well as to official emergency rules and regulations is often determined by sharp conflicts between fear of personal loss on the one hand and social conformity motives on the other. Thus, conflict theory may prove to be a valuable source of testable propositions concerning various sorts of emotional dilemmas that arise in danger situations, even though it may fail to have any bearing whatsoever on some of the most important general propositions concerning the conditions under which strong reactions of apprehensive avoidance and of stunned immobility occur.

It is certainly to be hoped that someday we shall be in the enviable scientific position of being able to set up extremely catholic standards for constructing theory, so that we shall be warranted in living up to extremely high quality and quantity ambitions. In the meantime, we ought to feel elated with any new theoretical concept and any new piece of evidence that helps us to arrive at a warranted generalization concerning one or more determinants of any given reaction variable. Such generalizations are, of course, essential building blocks of the science of human behavior. They are the stuff that our dreams of theory should be made of.

REFERENCES

1. Carr, L. J., "Disaster and the sequence-pattern concept of social change," *American Journal of Sociology,* 1932, *38,* 207.
2. Dollard, J., and Miller, N. E., *Personality and Psychotherapy.* New York: McGraw-Hill, 1950.
3. Grinker, R. R., and Spiegel, J. P., *Men Under Stress.* Philadelphia: Blakiston, 1945.
4. Hovland, C. I., Janis, I. L., and Kelley, H. H., *Communication and Persuasion.* New Haven: Yale Univ. Press, 1953.
5. Janis, I. L., *Air War and Emotional Stress.* New York: McGraw-Hill, 1951.
6. Janis, I. L., *Proposals for Field Research on the Psychological Impact of Peacetime Disasters.* Report for Rand Corporation, Crisis and Disaster Study, (Mimeo.) 1949, 60pp.
7. Killian, L. M., "The significance of multiple-group membership in disaster," *American Journal of Sociology,* 1952, *57,* 309-14.
8. Leighton, A., "Psychological factors in major disasters." *Medical Projects Reports,* University of Rochester, 1951.
9. National Research Council (Div. of Med. Sci.) and Walter Reed Army Medical Center., *Symposium on Stress.* Washington: Army Medical Service Graduate School, 1953.
10. Postman, L., and Bruner, J. S., "Perception under stress," *Psychological Review,* 1948, *55,* 314-323.
11. Powell, J. W., and Rayner, Jeannette, "Progress notes: disaster investigation," Report for Army Chemical Center, Md., (Mimeo) 1952.

12. Rado, S., "Pathodynamics and treatment of traumatic war neurosis (traumatophobia)," *Psychosomatic Medicine,* 1942, *43,* 362-368.
13. Schmideberg, Mellita, "Some observations on individual reactions to air raids," *International Journal of Psychoanalysis,* 1942, *23,* 146-176.
14. Tyhurst, J. S., "Individual reactions to community disaster: the natural history of psychiatric phenomena," *American Journal of Psychiatry,* 1950-51, *107,* 764-769.
15. Wallace, A. F. C., *Human Behavior in Extreme Situations: A Survey of the Literature and Suggestions for Further Research.* Report for Committee on Disaster Studies, National Research Council. (Mimeo.) 25pp.

The NORC Studies of Human Behavior in Disaster

Charles E. Fritz and Eli S. Marks[1]

The Analysis of Determinants

Investigation of reactions to disaster are mainly motivated by the need for information relevant to the prediction and control of behavior of populations exposed to the extreme stresses to be anticipated in war-time. Knowledge in this field is, obviously, of the highest importance. There are, however, very serious difficulties in obtaining valid and reliable information.

The high degree of individual variability in behavior during a disaster makes it very difficult to distinguish between reactions stemming from factors common to an entire population (e.g., nature of the disaster, social composition of the community) and highly individualized factors (e.g., previous disaster experience, social situation at the time of the disaster). The complex interrelationships of factors determining disaster reactions and the high variability of those reactions would point to a need for very careful controls of an experimental type if causal relationships are to be explored and isolated. However, experimentation is necessarily sharply limited by the fact that the extreme stresses of disaster situations cannot, in practice, be reproduced under controlled conditions. In the laboratory one can produce very frightening (and even traumatic) experiences but must stop short of those which constitute a real threat to the continued existence and health of the subjects involved—and actual disasters do not "stop short." An experiment cannot introduce the disaster stresses of overwhelming threat to life and limb, of sudden destruction of kin and intimates, of the pain and shock of serious personal injury and loss of home and possessions.

Types of study other than the experimental are handicapped by the difficulties of introducing the "controls" important to isolating fundamental causative factors and separating "individual peculiarities" from general behavioral principles. The need for knowledge in the field of disaster reac-

[1] The studies reported in this paper are the product of a research team whose composition varied over time. Substantial contributions to the final analysis were made by Rue Bucher, Dotsie Earle, Robert Endleman, Enrico Quarantelli and Leonard Schatzman.

tions makes it imperative that studies be undertaken; the handicaps to sound investigation make it equally imperative that analysis be cautious and definite conclusions be restricted to principles supported by a massive accumulation of evidence.

Nature of the NORC Disaster Studies

The studies of disaster reactions conducted by the National Opinion Research Center[2] were undertaken as exploratory studies—while every attempt was made to utilize sound scientific procedures, it was recognized that efforts must, in the main, be restricted to accumulating data that would form a basis for further, more definitive, studies or that could be added to other data already available in an attempt to amass an overwhelming accumulation of evidence.

The NORC disaster studies involved the interviewing of nearly 1,000 persons who had recently been involved in over 70 different major or minor disasters—ranging from large-scale tornadoes, explosions, and earthquakes to airplane crashes, industrial fires and accidents, building collapses, train wrecks, and so on. However, the majority of our interviews were obtained in 8 field trips to the following community disasters:

1. An airplane crash into a crowd of airshow spectators in the small farming community of Flagler, Colorado, September 15, 1951. The crash killed 20 persons and injured approximately 30.
2. A series of house explosions and fires due to illuminating gas and occurring over a period of about two hours in Brighton, New York, September 21, 1951. Despite heavy property damage—16 houses completely demolished, and about 25 heavily to slightly damaged—only 2 persons were killed and 24 injured.
3. The West Frankfort, Illinois, coal mine explosion, December 21, 1951, which killed 119 miners.
4. Three separate airplane crashes in Elizabeth, New Jersey, which took place within a period of two months. The first occurred on December 16, 1951; the second on January 22, 1952; and the third on February 11, 1952. Each of the crashes involved passenger planes and each occurred in different residential areas of the city. Total death toll for the three crashes was 106 passengers and 10 residents of Elizabeth; approximately 50 passengers and residents suffered injuries.
5. The Bakersfield, California, earthquake of August 22, 1952. Damage extended over 98 city blocks, with the central business district sustaining the heaviest destruction. The earthquake occurred during business hours; however, only 2 persons were killed and 32 injured.

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[2] This research was undertaken under a contract with the Army Chemical Center, Department of the Army. While the research was oriented towards problems of importance to the Army Chemical Center (and to the Department of Defense as a whole), conclusions or opinions expressed in this article are those of the authors and NORC; The Army Chemical Center (and the Department of Defense) are in no way responsible for the accuracy of the conclusions presented or the validity of the opinions expressed.

6. A tornado in White County, Arkansas, March 21, 1952. Part of a widespread series of devastating tornadoes covering 6 states, the tornado in White County was particularly severe. At least 46 persons were killed, and 615 injured. Nearly 350 houses were demolished and 600 damaged.

The design of each field investigation was varied to suit the particular problems and events studied. In general, however, all the studies had a number of features in common. First, although our studies covered a very large range of problems, they put primary emphasis upon the reactions and problems occurring during the immediate emergency and post-emergency period. This is the period in which the greatest stress and disorganization occur. In order to obtain valid data on the immediate behavior of the community being studied, we attempted to get into the field as rapidly as possible. Most of our field investigations were begun within a period of a few hours to three days following the occurrence of the event. Length of time in the field ranged from one to three weeks, depending upon the scope of the study.

The persons interviewed in each disaster consisted of: (1) a general sample of the population of the community; and (2) a special sample of persons in a position to observe the work of the various formal and informal rescue, relief, information, medical, control, and rehabilitation groups or agencies. The methods used in selecting the general sample depended upon the nature of the problems focussed upon. In the smaller-scale investigations, a combination of purposive and random area sampling was used; in the large-scale study of the Arkansas tornado (over 400 interviews), five separate communities having differing types and degrees of involvement were selected and respondents from these communities were chosen by probability methods.

To a considerable extent, the interviews were conducted on a non-directive basis. Using minimal probing activity and neutral questions whenever needed, the interviewer tried to obtain a complete account of the person's objective and subjective behavior during the pre-impact, impact, and post-impact period; how his behavior influenced and was influenced by interaction with others; his observations and evaluations of the behavior of other persons, groups, and agencies; and his previous experience in disasters and other crises.

Tape recorders were used to obtain a complete transcript of the interview. In their tape-recorded form, the interviews range in length from approximately 15 minutes to four hours, with an average length of about one and one half hours. The typewritten transcripts of the interviews obtained in the eight field trips mentioned average 29 pages per interview, yielding a total of over 15,000 typewritten pages.

The difficulties of analysis of data of the type described are considerable. Impressions based on a thorough reading of all the materials retain more of the "feeling tone" of the interviews than can be obtained by an elaborately detailed "statistical dissection." Such impressions are, however, subject to unknown (and possibly, large) biases arising from the analyst's implicit and explicit preconceptions. On the other hand, detailed "semi-objective" classification and cross-tabulation of the data are sharply limited by the analyst's ability to define categories which are (a) broad enough to group together phenomena which are psychologically equivalent despite gross differences in their external appearance (e.g., various manifestations—disguised and overt—of aggression) and (b) narrow enough to preserve some objectivity in making the classification. Highly objective, narrow categories result in atomization of the data and in actual misclassification because a statement taken out of context may have many interpretations, while the same statement buttressed and clarified by the entire text of the interview can be interpreted in only one way. Broad, subjective categories put one back into the general impression situation where the separate statements can be interpreted (and, frequently, misinterpreted) in line with preconceptions and with initial impressions based on other statements in the interview. A detailed classification scheme was used only for the data from the Arkansas tornado study mentioned above. Statements about the other NORC studies are based on examination of the interview transcripts without attempting any detailed classification or statistical checking.

In considering the data presented below it is important to keep in mind the procedures and conditions under which they were obtained. As indicated above, experimental controls were not attempted; for some of the studies, sampling of the population involved was only partially controlled; the classifications used are far from perfect and the application of these classifications was subject to considerable variable error as well as to analyst bias.

The materials presented in this paper are a drastic selection from the great mass and variety of data available from our studies of disaster reactions. Because of space limitations, the presentation has been restricted to a few of the findings of the general study.

Types of Disaster Reaction

While reactions to a disaster vary considerably from individual to individual and from one type of disaster to another, certain general "modes" of reaction can be distinguished. These can be classified into reactions with an increase in activity level ("agitated" reactions) and reactions with a decrease in activity level ("depressive" reactions).

Considerable attention has been focussed in the literature on disaster

behavior on *one* type of agitated reaction—panic. The term "panic" has been used quite widely (and quite loosely) to describe a wide variety of "irrational" behavior of individuals exposed to danger situations. It has, in fact, been used to describe behavior in situations of such widely different content that one is hard-pressed to name *any* element the situations have in common. A careful analysis of the literature on panic and of the NORC disaster studies material has been made by Mr. Enrico L. Quarantelli[3] and the present discussion is drawn principally from Mr. Quarantelli's analysis.

While the exact nature of panic behavior has never been precisely defined, customary usage of the term implies: (a) a highly agitated emotional state (fear, acute anxiety) and (b) uncontrolled (physical) flight. The term has, of course, also been applied to conditions where flight was psychological rather than physical but the use of "panic" in connection with disaster behavior has referred to actual (or attempted) *physical* flight.

With a few exceptions, the literature on disaster places heavy emphasis on panic behavior—so much so that one gains the impression that this is the most important (and most common) type of disaster behavior. While it is true that panic behavior can, in some cases, cause more damage than the disaster itself, our disaster materials suggest that it is an *unusual,* rather than a common, reaction to disaster. Panic behavior in the 8 disasters mentioned above, is reported only for the Brighton explosions and the Bakersfield earthquake and, in a few instances, in the Flagler and Elizabeth plane crashes. Panic behavior was also reported in some of our other studies (e.g., in a factory explosion in St. Paul, Minnesota). For the Arkansas tornado (where an attempt was made to classify carefully all actions during impact), no case of "uncontrolled flight" (panic) was reported and only 2% of the cases are classified as reporting an "agitated state involving uncontrolled behavior" (the behavior, in these cases, being weeping and "hysterical" in nature rather than flight).

Analysis of the relatively few cases of actual panic in our materials suggests that it occurs only when:

1. the individual believes himself to be in a situation involving *immediate threat* of personal destruction and

2. the individual believes escape is possible at the moment but may become impossible in the immediate future—i.e., that unless one gets away, one will be trapped.

If these conditions are necessary to panic behavior, one might antici-

[3] *A Study of Panic: Its Nature, Types and Conditions.* Unpublished Master's thesis, University of Chicago, 1953, pp. 1-39.

pate that panic would be less likely to occur *following* a bombardment than *during* one. However, bombing may produce physical situations in which people feel trapped and, consequently, may engage in panic flight. An atomic bombing with no forewarning and with brief duration would, then, be unlikely to produce a panic while a brief (and inadequate) forewarning might produce fear of entrapment and resultant panic. The phrase "immediate threat" above should also be stressed. Warning of a bombing to occur in 5 or 10 minutes might produce controlled flight and acute emotion but not panic. On the other hand, warning that "bombs are being dropped now" might be a stimulus to panic behavior.

As indicated above, reactions to disaster will vary with the individual and with the nature of the disaster (and, most likely, with a number of other factors). In our study of the Arkansas tornado, the relative frequency of various "affective reactions" reported as occurring during and immediately before the tornado impact is shown in Table 1.

Table 1

PER CENT OF RESPONDENTS WHO REPORT CERTAIN AFFECTIVE REACTIONS OF THEIR OWN DURING IMPACT

Affection Reaction Reported	*Per Cent of All Respondents*	*Per Cent of Female Respondents*	*Per Cent of Male Respondents*
Highly agitated state but behavior controlled	32%	39%	25%
Mildly agitated state but behavior controlled	19	18	21
Highly agitated state—degree of control unstated	6	10	3
Mildly agitated state—degree of control unstated	6	6	6
Highly agitated state—involving uncontrolled behavior	1	3	—
Mildly agitated state—involving uncontrolled behavior	1	1	—
Confusion, uncertainty, bewilderment	7	6	8
Shocked, stunned, dazed	6	9	3
Shocked, stunned, dazed—due to physical concussion	1	1	—
Unconscious	1	3	—
Miscellaneous—anger, resignation, hostility	4	4	4
Calm, unexcited, self-controlled	19	12	26
Number of Interviews	N=139	N=67	N=72

It will be noted that a relatively high proportion of the respondents reported themselves as in an "agitated" state but the proportion reporting "uncontrolled behavior" is very small. Reports by participants are, of course, not entirely dependable, particularly where the report involves admission of behavior deviating from the socially approved. The fact that *none* of the male respondents reported anything that could be interpreted as "uncontrolled behavior" may reflect this conformity to social norms. However, the reports of respondents on behavior of *others* present with them during impact, tend to confirm the respondent's own reports.

Table 2

PER CENT OF RESPONDENTS REPORTING CERTAIN AFFECTIVE REACTIONS OF ADULTS OF OPPOSITE SEX PRESENT WITH THEM DURING IMPACT

Affective Reaction Reported	*Per Cent of Male Respondents—Reports on Adult Females*	*Per Cent of Female Respondents—Reports on Adult Males*
Highly agitated state but behavior controlled	32%	28%
Highly agitated state involving uncontrolled behavior	11	3
Shocked, stunned, dazed	1	3
Calm, cool, unexcited	3	4
Number of Interviews	N=72	N=67

Obviously, reports of affective reactions of others do not include the "mildly agitated" and "confused" states since these, in general, were not accompanied by overt behavorial manifestations. The category "highly agitated but behavior controlled" is roughly comparable in the two tables but the category "highly agitated with *uncontrolled* behavior" in Table 2 is probably comparable to a combination of both categories involving uncontrolled behavior in Table 1. As might be expected, uncontrolled behavior of others is more frequently reported than uncontrolled behavior of oneself but the relative frequency is still small. Of course, since the "adult of opposite sex" present with the respondent was usually the spouse, the reports in Table 2 are also subject to social conformity bias, but the general picture is still one in which there was considerable affective reaction but relatively little uncontrolled behavior. In no case was panic flight reported either for oneself or for others.

During the period immediately following the passing of the Arkansas

tornado (within a half-hour), respondents who had experienced the tornado's impact reported the affective states shown in Table 3.

Table 3

PER CENT OF RESPONDENTS REPORTING CERTAIN AFFECTIVE STATES IMMEDIATELY AFTER IMPACT

Affective Reaction Reported	*Per Cent of All Respondents*	*Per Cent of Female Respondents*	*Per Cent of Male Respondents*
Agitated state but no uncontrolled behavior	45%	46%	45%
Highly agitated state involving uncontrolled behavior	6	10	1
Shocked state (i.e., "stunned," "dazed," "shocked")	14	22	5
Other affective states not specified above	1	3	—
Calm and unexcited	8	4	11
Number of Interviews	N=139	N=67	N=72

In general, affective reactions after impact are similar to those during impact. There may possibly, have been an increase in the frequency of the "depressive" (shocked, stunned, dazed) reactions as an aftermath of the tornado experience but the evidence is insufficient for any definite conclusion.

It will be noted that the Arkansas tornado (and also our other studies) disclose very few instances of panic or of other forms of uncontrolled behavior. There was, however, a very considerable amount of confused and uncoordinated activity during and following almost all of the disasters studied by us. An exception is the West Frankfort coal mine explosion where the community affected was one used to, and organized for, disaster. In West Frankfort, activities following the explosion were highly organized and emotional reactions, while present and intense, were kept under rigid control. Our data indicate that the *immediate* problem in a disaster situation is neither uncontrolled behavior nor intense emotional reaction but deficiencies of coordination and organization, complicated by people acting upon individual (and, often conflicting) definitions of the situation. It is this aspect of disaster behavior which is frequently identified erroneously as "panic."

The extent to which a picture of reaction modes derived from our Arkansas data would apply in other disasters (particularly, to war-time disasters) is, of course, not determinable. The population studied was predominantly small-town and rural and confined to a particular locality. Behavior of urban or metropolitan populations or of populations in other areas, may well be different even in a similar type of disaster. Our studies of other

types of disaster (with other types of population) do not lend themselves to precise statistical treatment. Our general impression is that these other disasters show roughly similar patterns of emotional reaction but that the frequency and persistence of given behavior vary substantially with the nature of the disaster and the type of personal involvement. Thus, the Bakersfield earthquake (in which the number killed and injured was much less than in the Arkansas tornado) might suggest equally intense reactions *during* impact but much less prolonged reactions following it. In the Brighton explosions, the nature of the disaster (uncertainty about the cause of the event, uncertainty about what would happen next, prolonged duration) and differences in the population affected (women and children in a suburban community) seems to have been accompanied by somewhat greater prevalence of confused and agitated states continuing over a much longer time period.

Most of the persons who experienced the impact of the Arkansas tornado (90 per cent) reported some form of acute emotional, physiological or psychosomatic after-effect. In many cases these after-effects were of extensive duration—53 per cent of the respondents reported physiological-psychosomatic effects lasting for a day or more and 72 per cent reported psychological disturbances lasting a day or more. Among the more common protracted disturbances were:

	Per Cent of Respondents Reporting
Nervousness, excitability, hypersensitivity	49%
Sleeplessness or poor sleep	46
Inability to concentrate	37
Loss of appetite	29
Headaches	19
Anxiety dreams, nightmares	18
"Dazed," confused condition	14

In the other disasters studied by NORC, similar symptoms were observed. There were also a large number of reports of miscellaneous symptoms such as nausea, feelings of fatigue, soreness or stiffness of muscles and (vague) general malaise.

The existence of these types of reaction to *any* disaster, raises a considerable problem in emergency medical treatment of victims of an atomic, chemical or biological attack, since the symptoms reported are those which would arise in case of radiation sickness, chemical poisoning, etc. In the event of an attack, a great deal of anxiety (and a swamping of medical facilities) would undoubtedly occur if the population believes that these symptoms are necessarily indicative of poisoning or contamination. On the other hand, too much assurance that these symptoms are usual aftermaths of a disaster may result in actual victims failing to seek medical attention. A similar dilemma arises in the briefing of medical personnel (particularly

auxiliary personnel)—failure to emphasize that these symptoms will occur without exposure to radiation, poisoning, or infection may result in diversion of effort from actual victims, while overemphasis on the possibility of psychosomatic symptoms may result in the symptoms of actual victims being dismissed as psychosomatic in origin (until the condition has progressed to a point where treatment is hopeless).

Some Factors in Disaster Reactions

While there seem to be certain types of reaction present in almost all disasters, there are a multitude of factors which act to produce differences in the intensity and frequency of these reactions. The factors discussed briefly below are selected, not because they are necessarily of major importance in all disasters, but because they were fairly salient in the disasters studied by NORC and particularly in the main study (the Arkansas tornado) which was subjected to detailed statistical analysis.

Forewarning

One factor which can be expected to have a considerable effect on reactions to a disaster is the amount and nature of forewarning of the disaster impact. In general, adequate warning can do much to mitigate the consequences of a disaster. On the other hand (as suggested above in connection with panic) brief or incomplete warning of an impending disaster may be actually harmful.

Most of the disasters studied by NORC struck with practically no warning to the victims. Such events as airplane crashes and explosions obviously occur without advance notice. In the case of tornadoes, floods, and bombing attacks, there may be a possibility of warning a community that a disaster is heading in its direction. The effectiveness of such warnings is, however, dependent upon the communications system available. Radio is, of course, the most pervasive medium for rapid notification of an affected (dispersed) population. Unfortunately, there is little assurance that any of an affected population will be listening to a broadcast warning, and even those persons who are listening may not attend very closely to a warning or may not attach personal application to it. Nevertheless, radio warnings, if heard at all, may help "sensitize" the individual to cues generated by the approaching catastrophe itself.

Sensitization to any approaching disaster is of great importance in determining the amount of forewarning because of the marked tendency of people to interpret disaster cues in normal terms—at least in the instances studied by NORC. Thus, in the Arkansas tornado, 40 per cent of the re-

spondents noted the "roaring" sound of the tornado prior to actual impact but only 29 per cent interpreted the roaring as implying a seriously threatening event. Respondents reported that they initially interpreted this cue as a train passing. In disasters with a "more subtle approach," the tendency to assimilate to normal experience may be even more marked. For example, in a carbon monoxide asphyxiation incident occurring in an industrial plant, we found that workers initially assimilated their physical symptoms to such personal interpretations as excessive eating or drinking, staying up too late the night before, or chronic illnesses from which they normally suffered.

In both the tornado and the carbon monoxide studies, social interaction was of considerable importance in giving warning of the danger. In the case of the carbon monoxide asphyxiation, conversation among the workers and observation of each other's behavior were the principal factors leading to a definition of the situation. For the Arkansas cases (as shown in Table 4) there is also a definite association between social interaction and forewarning.[4]

Table 4

PER CENT OF RESPONDENTS WITH DIFFERENT AMOUNTS OF FOREWARNING BY PRESENCE OR ABSENCE OF SOCIAL INTERACTION IMMEDIATELY PRIOR TO IMPACT

Amount of Forewarning	*Presence or Absence of Social Interaction*		
	No Social Interaction	*Some Social Interaction*	*No Information*
No forewarning	70%	20%	62%
Less than a minute	19	39	3
More than a minute	10	41	34
Number of Interviews	N=31	N=79	N=29

There is evidence that the amount of forewarning in the Arkansas tornado was related to the reactions of the individuals in the impact area and to the losses sustained by them (see Tables 5 and 6).

[4] The classification of respondents by amount of forewarning is necessarily subject to substantial inaccuracy. Individuals' estimates of elapsed time are notoriously inexact even under normal conditions and, in this case, the respondents had passed through an extremely vivid and disturbing experience between the period recalled and the time of interview. In addition, the "endpoint" of the time interval is a "variable" since there is an appreciable (though short) interval between the first severe wind effects of a tornado and the arrival of its epicenter. "Less than a minute" means that the analysts interpreted the respondent's statements as indicating that there was practically no elapsed time between their realization that a serious danger threatened and impact of the full fury of the storm. These judgments (and the respondents' estimates on which they are based) are highly subjective and there was, undoubtedly, substantial overlap between the "less than 1 minute" category, the "no forewarning," and the "more than 1 minute" categories. This overlap probably acts to reduce the relationship and the differences shown may be, in actuality, underestimates.

Table 5

PER CENT OF RESPONDENTS TAKING PRECAUTIONARY OR PROTECTIVE ACTION BY PERIOD AND BY EXTENT OF FOREWARNING

Actions Taken	*Amount of Forewarning*		
	None	*Less than 1 minute*	*More than 1 minute*
Actions Taken Immediately Before Impact			
Precautionary	13%	24%	33%
Protective (of self)	2	21	20
Protective (of others)	—	29	36
Initial Action Taken in Impact			
Precautionary	29%	18%	7%
Protective (of self)	30	39	53
Protective (of others)	5	34	22
Number of Interviews	N=56	N=38	N=45

The data in Table 5 may be partly "tautological"—i.e., to some extent, amount of forewarning was undoubtedly estimated by the respondent (and by the analyst) in terms of intervening activities. Nevertheless, the relationship is probably valid—protective action (both with respect to self and others) was taken earlier and more frequently by those who had some forewarning. The increasing frequency of precautionary action before impact and the decreasing frequency after impact with degree of forewarning also reflect the more adaptive and realistic behavior possible to those persons who realized the danger sooner.

While Table 5 suggests more adaptive reactions for both those with brief forewarning and those with more extensive forewarning, data on losses sustained (see Table 6) indicate that the brief forewarning may have tended

Table 6

PER CENT OF RESPONDENTS WITH DIFFERENT AMOUNT OF FOREWARNING SUFFERING SPECIFIED LEVELS OF LOSS

Loss Sustained	*Amount of Forewarning*		
	No Forewarning	*Less than 1 minute*	*More than 1 minute*
Death Loss			
High	2%	3%	2%
Medium	27	42	27
Low	72	55	71
Injury Loss			
High	5%	21%	9%
Medium	30	34	33
Low	64	45	58
Property Loss			
High	64%	63%	62%
Medium	36	34	38
Low	—	3	—
Number of Interviews	N=56	N=38	N=45

to *increase* rather than decrease the effects of the tornado. While definitive evidence is not available, comparison of actions taken with losses sustained, would suggest that people who had only brief forewarning took action with a protective *intent,* but that the actions taken may have actually increased their danger or they may have been caught unprotected during the process of taking protective action.

It will be seen that death losses and injury losses (injury of respondent or immediate family) were actually *higher* for the group which had brief forewarning than for *either* the group with no forewarning or the group with more extensive forewarning. The no forewarning and extensive forewarning groups show only minor differences in extent of loss. While this may seem peculiar, it is understandable in terms of the fact that even 5-minutes warning may have been inadequate for completely effective protective action but was sufficient to permit reasonable consideration of supposedly protective actions and rejection of those which actually increased risk. While these data must be regarded with considerable scientific skepticism (in view of the sources of error mentioned above), there is some support for their validity in the fact that the property-loss picture in Table 6 is very nearly identical for the three groups—a result which should, of course, obtain if the three groups were subject to an equally intense tornado impact and are actually differentiated by extent of forewarning and not by some differential exposure to risk.

Conditions That Aggravated Emotional Disturbance

The emotional disturbance accompanying the impact of a disaster may be augmented, often acutely, by the experiences of victims following a disaster. Our data suggest two types of post-impact experience which are of particular importance in this respect: (a) separation of family members with accompanying acute anxiety about the whereabouts and welfare of the missing members and (b) the traumatic effect of seeing badly mangled bodies, large numbers of dead, horribly injured people, and bereaved relatives.

One of the more serious problems immediately following a disaster is that of handling people in a state of acute anxiety about the welfare of close relatives who were thought to be in the disaster area at the time of impact. This problem is particularly acute if disaster strikes at a time when family members are in different locations. For example, the Brighton explosions occurred in a suburban community at a time when most of the men of the community were at work and the older children were at school, leaving the women alone with small children. During the course of this disaster, there was ample evidence of acute anxiety of the women with respect to children away at school (but physically near the disaster area) and of men with respect to their wives and families. This anxiety was heightened by the difficulties and dangers of moving into or within the affected area. Men, on hearing of the disaster, initially tried to reach their families by telephone.

Failing in this, they began to drive back to Brighton (some did this without attempting to phone). The result was a terrific traffic jam, aggravated by curious and "helpful" outsiders flocking towards the area, which, of course, further heightened the anxiety of the men and also impeded the movement of rescue and disaster relief units into the area. When the husbands finally reached the area, they found road blocks which had been set up to keep out unauthorized people. Some of the husbands evaded the road blocks or "talked" themselves past them.

In the Arkansas tornado, most families were together at the time of impact (about 5:30 P.M.). About one-fourth of the respondents reported that one or more household members were separated from them at the time the tornado struck (some of these respondents were themselves away from home at the time). It can be seen from Table 7, that the only observable difference between those persons who were separated from their immediate families and those who were not, is a slightly higher frequency of "shocked, stunned or dazed" conditions among the separated group.

The difference in emotional state between those persons who were separated from their immediate families during impact and those who were not is somewhat obscured by the fact that some of the individuals who were away from their families were reunited with their families within a short time after the tornado passed. For these persons, any emotional tension due to the separation was of brief duration. Separation from immediate family was, however, not the only source of concern about missing relatives and intimates. In a village and rural area of the type involved in the Arkansas tornado, ties to extended family (parents, siblings, etc.) and intimate friends can be quite strong and concern over such persons may greatly affect the individual's emotional state.

Table 7

PER CENT OF RESPONDENTS EXHIBITING CERTAIN AFFECTIVE STATES BY TIME PERIOD, SEPARATION FROM OTHER HOUSEHOLD MEMBERS AND "SEARCHING" ACTIVITIES

Main Affective States Reported	*Separation from Family**		*Search for Intimates***	
	Separated	*Not Separated*	*Searched*	*Did Not Search*
Immediately Following Impact				
Agitated	50%	53%	64%	41%
Shocked, Stunned, Dazed	25	10	28	8
During 6 Hours Following Impact				
Agitated	41%	46%	53%	7%
Shocked, Stunned, Dazed	31	10	26	14
Number of Interviews	N=32	N=105	N=61	N=78

*One or more household members absent from respondent.
**Took active steps to locate kin or intimates at some time during the 6 hours following the tornado impact.

When we compare the Arkansas respondents who made relatively intensive attempts to locate kin or intimates[5] with those who did not, we find greater prevalence of agitated emotional states (anxiety, fear, etc.) immediately following impact among the "searchers" and an even more marked persistence of such agitation over the 6-hour period from end of impact (about 6 P.M.) to midnight. The relationship is, of course, open to numerous questions. In particular, it is possible that the differences shown may reflect differences in other characteristics between the "searchers" and those who did not search—the difference in prevalence of "shocked, stunned, dazed" conditions tends to support such an hypothesis—but the size of the groups of respondents involved precludes any complete analysis along these lines. The age-sex composition of "searchers" and "non-searchers" was somewhat different. As might be expected, there was a substantially higher proportion of males and younger persons (18 to 50 years of age) among those who searched than among those who did not search. However, since males less frequently reported marked emotional states following impact than females and there is very little difference between younger and older persons, the higher incidence of marked emotional reactions among searchers cannot be attributed to the differences in age and sex composition. The age-sex comparison, therefore, tends to support the hypothesis of a positive relationship between separation of kin or intimates and the prevalence of agitated emotional states.

The other major traumatic experience in the aftermath of disaster is exposure to the dead and badly injured and their families. Our data on this point are primarily impressionistic. For most of the disasters studied, the number of respondents who had some direct experience of the dead was small. There is evidence, however, that such experiences were profoundly disturbing and that disturbance increased with the degree of exposure. For

Table 8

ESTIMATED PERCENTAGE OF RESPONDENTS HAVING TRAUMATIC REACTIONS TO THE DEAD OR INJURED

Traumatic Reactions Reported	*Per Cent of Group Which Handled Dead*	*Per Cent of Group Which Saw but Did Not Handle Dead*
To large numbers of dead or injured	7%	15%
To physical condition of dead or injured	60	26
To expressive behavior of victim or victim's family	9	6
To other traumatic aspects	53	12
No traumatic reaction mentioned	29	57
Number of Interviews	N=25	N=51

[5] Some of the persons separated from household members are among the people who "searched."

example, in the Arkansas tornado, individuals who had direct physical contact with the dead (carried them, pulled them out of debris, cleaned them, layed them out, etc.) more often reported their experiences as traumatic (or intensely disturbing) than those who saw but did not handle the dead. Those who handled the dead were particularly disturbed by the mangled condition of the bodies (see Table 8). These differences are, however, based on relatively few interviews and include some cases from the sample from communities immediately surrounding the tornado-struck area.[6] The differences shown are subject to a very large sampling error and are probably not statistically reliable, but they do conform to the hypothesis suggested.

Summary

The present paper has reviewed a few of the findings of the National Opinion Research Center studies of human behavior in disasters. The findings reviewed indicate that:

1. Panic flight and other highly uncontrolled forms of behavior appear to occur under quite restricted conditions present only in some disasters and only for some of the persons involved in such disasters. It is not the irrationality or uncontrolled nature of individual behavior that raises the *major* control problems in disasters; rather it is the lack of coordination among the large number of persons acting on the basis of different (and oftentimes conflicting) personal definitions of the situation.

2. The amount of warning of an impending disaster may have very substantial bearing upon the actions taken and the losses sustained by the individuals and groups involved. There is evidence that inadequate warning may actually lead to more serious loss than no warning at all.

3. There is evidence that emotional reactions to disaster may be greatly aggravated by the experiences of separation from other family members and of intimate contact with the dead and injured. The evidence is far from conclusive but would suggest that further research along these lines may well be extremely fruitful.

[6] Because of the large difference in sampling rates from the disaster community and the surrounding communities, cases were weighted in computing the percentages of Table 8.

Preparation of Soldiers for Atomic Maneuvers[1]

Shepard Schwartz and Berton Winograd[2]

The Army's experience in preparing troops for exposure to an atomic explosion is presented here as a potentially useful source of findings for understanding the larger and more general problem of the psychological preparation of populations for their possible exposure to disaster conditions.

During recent years the United States Army has conducted a series of field maneuvers in the course of which atomic explosives were detonated in the presence of participant troops. As part of their preparation for the field exercises troops were given an intensive course of indoctrination lectures concerning atomic weapons and warfare. Special emphasis was placed in the lectures on the destructive qualities and effective ranges of the bomb; on individual protective measures; and on appropriate behavior before, during, and after the bomb's detonation. The lectures were also intended to reduce the men's anxieties about the bomb, and to promote confidence among them in their ability to participate successfully in the maneuver and—should the eventuality arise—in atomic combat.

The Human Resources Research Office (HumRRO), beginning with the first of the DESERT ROCK A-bomb maneuvers, undertook a series of three investigations which had as a major objective evaluation of the effect of the indoctrination on troops.

In general, HumRRO's DESERT ROCK research was directed at two problems related to the effect of indoctrination:

1. Did troops' knowledge about atomic weapons and warfare increase as a result of indoctrination?
2. In what way were troops' attitudes about atomic weapons and warfare modified?

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[2] The authors express their thanks to Ira H. Cisin and John L. Finan for their active participation in preparing this article, and for their guidance in the course of the research.

The Method

In the initial studies of the A-bomb maneuvers, *Exercise DESERT ROCK I,* and *Exercise DESERT ROCK IV,* the design involved two groups of men drawn at random from battalions which participated in the DESERT ROCK exercises. Before the men had been notified that they were to engage in an A-bomb maneuver at Camp Desert Rock, "baseline" questionnaires were administered to the first of these random groups. Later, after the men had arrived at Camp Desert Rock and had received the course of lectures, questionnaires were administered to the second group.[3]

The design of the third of the HumRRO studies, *Exercise DESERT ROCK V,* required that the same men who had been tested at baseline be tested again after indoctrination. This "before-after" design was used in preference to the random-group design described above in order that the relationship between information gain and attitude modification could be estimated directly. Testing the same men before and after the indoctrination appeared permissible on the basis of the DESERT ROCK IV data which showed retest effect to be inconsequential.

In each of the three studies, the questionnaire administered before the indoctrination was practically identical with the one administered after indoctrination. The questionnaires included two major groups of items: (1) a group of questions designed to test the men's information about atomic weapons and warfare, and (2) a group of questions designed to test the men's attitudes toward atomic weapons and warfare.

The findings concerning the effect of indoctrination on troops' overall knowledge of atomic weapons and warfare are clear and consistent. In all three of the studies a substantial increase in information was observed following indoctrination.

Table 1

AVERAGE PERCENTAGE OF CORRECT RESPONSES TO INFORMATION QUESTIONS, BEFORE AND AFTER INDOCTRINATION

Study	*Before Indoctrination (Baseline)*	*After Indoctrination*
DESERT ROCK I (30 items)	40% (N=112)	72% (N=122)
DESERT ROCK IV (26 items)	26% (N=94)	50% (N=89)
DESERT ROCK V (16 items)	24% (N=190)	47% (N=190)

[3] Additional groups of men were tested at subsequent times during and after the maneuver. The findings relevant to the present paper, however, are based exclusively on the baseline and post-indoctrination stages of the research.

Although the lectures were generally effective in teaching men facts concerning atomic weapons and warfare, analysis of the specific questions in the information tests indicates that some kinds of information were learned more readily than others. This selective learning was first observed in the analysis of a group of 17 true-false items which formed part of the DESERT ROCK I information-test battery. Although an average overall gain of 29 percentage points had been observed on these items (47 per cent correct answers at baseline as against 76 per cent after indoctrination) it was noted that some items had contributed only trivially or even negatively to this overall gain.

A number of *post facto* hypotheses were devised in an attempt to explain this finding. Among these was the hypothesis that disproportionately large gains had occurred on questions dealing with such personally injurious effects of the bomb as impotence, sterility, blindness, burns, and deformity.

To test this hypothesis the 17 true-false questions were dichotomized. The first of the resulting groups consisted of seven questions which were judged to concern "personal injury;" the second group, of ten questions which were judged to be "non-personal injury" items.[4]

As appears from the data presented in Table 2, information about personal injury increases to a greater extent than information not concerned with personal injury.

In DESERT ROCK IV a further attempt was made to test the "personal injury" hypothesis. Of the 24 classifiable items, eight were judged to be personal injury items.[5] The findings proved similar to those of DESERT ROCK I.

Table 2

AVERAGE PERCENTAGE OF CORRECT RESPONSES TO PERSONAL INJURY AND TO NON PERSONAL INJURY QUESTIONS, BEFORE AND AFTER INDOCTRINATION

Items	*Before Indoctrination*	*After Indoctrination*
Exercise DESERT ROCK I		
Personal Injury	38% (N=112)	79% (N=122)
Non Personal Injury	53% (N=112)	75% (N=122)
Exercise DESERT ROCK IV		
Personal Injury	27% (N=94)	61% (N=89)
Non Personal Injury	26% (N=94)	46% (N=89)

[4] Space consideration precludes a detailed presentation of these items, which the authors will furnish on request.

[5] Space consideration precludes a detailed description of the 8 personal injury and 16 non personal injury items analyzed in DESERT ROCK IV. The writers will be glad to furnish these questions.

The Findings Concerning Attitudes

The DESERT ROCK I and DESERT ROCK IV findings concerning the effect of indoctrination on the troops' attitudes were inconclusive owing to the fact that the study of changes in troops' attitudes before the actual field maneuver was not a major objective in these two studies. In DESERT ROCK V, however, a major emphasis was placed on determining the extent to which troops' attitudes concerning atomic weapons and warfare were modified following the indoctrination.

The DESERT ROCK V questionnaire, which as already mentioned was administered to the same men before and after indoctrination, contained a series of questions designed to measure four militarily important attitudes toward atomic weapons and warfare.[6]

1. The soldier's own anxieties about exposure to atomic effects.
2. The soldier's perception of other troops' anxieties about such exposure.
3. The soldier's confidence in his ability to do well in atomic combat.
4. The soldier's willingness to volunteer for a mission involving exposure to radiological hazards.

A comparison of the baseline responses to these attitude questions, with responses made following indoctrination, indicates that the overall information gain previously described was paralleled by a considerable degree of attitude improvement. (See Figure I.) Following indoctrination there were decreases in the number of men who indicated anxiety about their own exposure to atomic effects, or who perceived other troops as being anxious about such exposure. There was a considerable increase in the number of men who believed they would do well in A-bomb combat, and an insignificant increase in the number who expressed willingness to volunteer for a mission involving possible radiological hazard.

Since the net attitude changes described in Figure I did not consider turnover of attitudes, further analysis was done. In Figure II changes in attitude among men who held unfavorable attitudes at baseline are presented separately from men who, at baseline, held favorable attitudes, so that the total turnover of individuals may be observed.

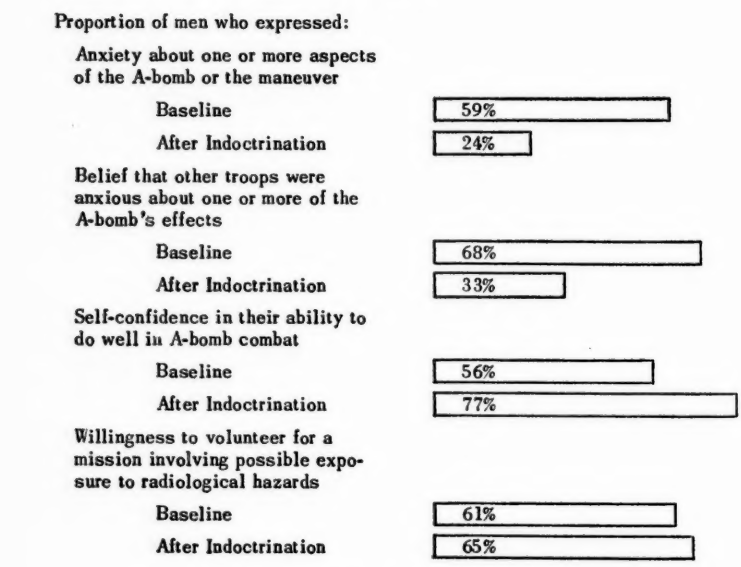
In summary, Figure II shows that a substantial amount of attitude improvement took place following indoctrination, while relatively little attitude deterioration occurred. A majority of the men who expressed anxiety at baseline indicated no anxiety after indoctrination; a majority of men who initially believed that other men were anxious did not retain this belief; a majority of those who were not confident became confident; a substantial

[6] The questions used will be supplied by the authors on request.

minority of those who had been unwilling to volunteer became willing. In contrast, only a small number of men showed deteriorated attitudes after indoctrination.

FIGURE I

TROOPS' ATTITUDES
TOWARD ATOMIC WEAPONS AND WARFARE,
BASELINE AND POST-INDOCTRINATION
(N = 190)



General Information Gain in Relation to Attitude Modification

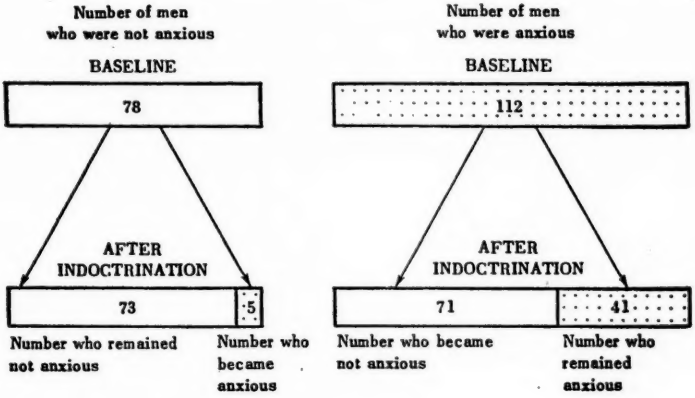
A critical problem connected with the indoctrination of troops for atomic maneuvers is that of determining the attitudinal changes associated with information gain. This problem is of general importance in the evaluation of many kinds of information programs.[7] In the DESERT ROCK studies, the problem consisted of determining the extent to which the acquisition of information about atomic weapons and warfare affected men's anxieties about such weapons and warfare.

[7] See, for example, pp. 154, ff. in Klineberg, Otto, *Tensions Affecting International Understanding; A Survey of Research*, Bulletin 62, New York, Social Science Research Council, 1950.

FIGURE II

TROOPS' IMPROVEMENT AND DETERIORATION IN ATTITUDES, BASELINE TO POST-INDOCTRINATION

Anxiety About the A-Bomb



Belief That Other Troops Were Anxious

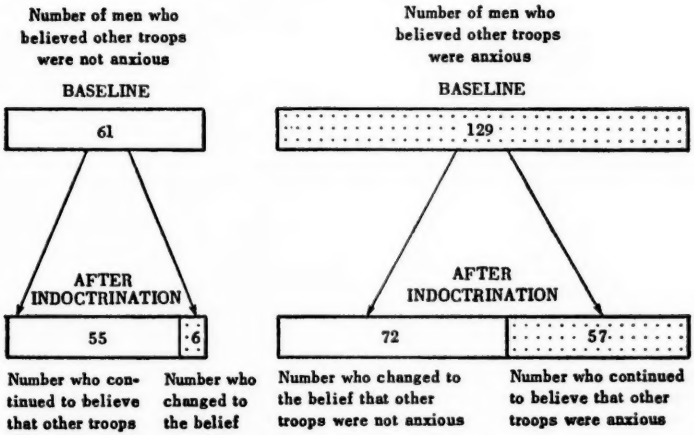
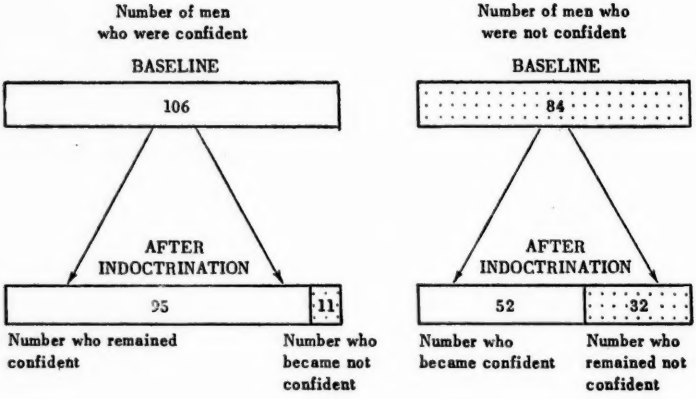

Number of men who believed other troops were not anxious
BASELINE
61
AFTER INDOCTRINATION
55
6
Number who continued to believe that other troops were not anxious
Number who changed to the belief that other troops were anxious
Number of men who believed other troops were anxious
BASELINE
129
AFTER INDOCTRINATION
72
57
Number who changed to the belief that other troops were not anxious
Number who continued to believe that other troops were anxious

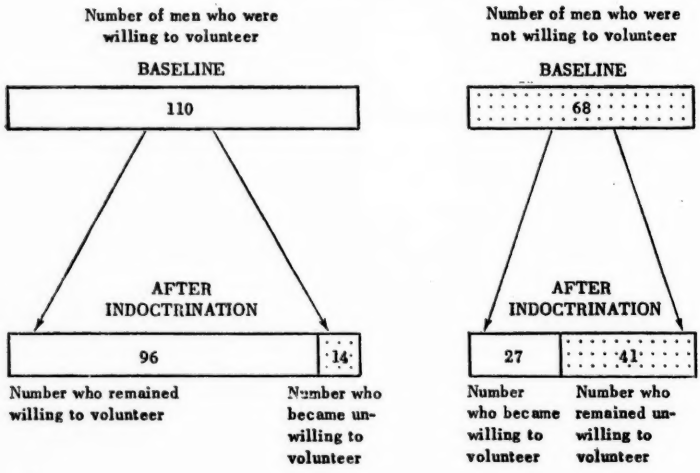
FIGURE II (continued)

TROOPS' IMPROVEMENT AND DETERIORATION IN ATTITUDES, BASELINE TO POST-INDOCTRINATION (continued)

Self-Confidence



Willingness to Volunteer

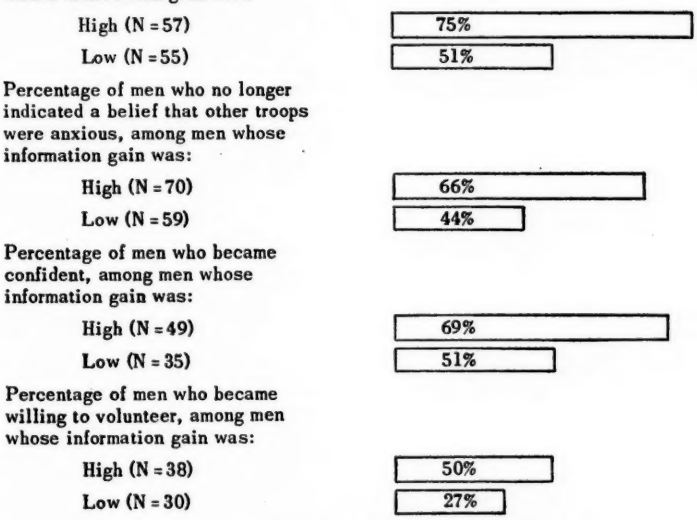


For purposes of comparison, the men were classified according to the extent to which they gained information from the first to the second test. Those who gained four or more correct answers were classified as having "high gain"; men who gained three or fewer were considered to have "low gain".[8] Figure III presents a comparison of attitude improvement in the two groups.[9]

FIGURE III

TROOPS' IMPROVEMENT IN ATTITUDES TOWARD ATOMIC WEAPONS AND WARFARE BY GAIN IN INFORMATION, BASELINE TO POST-INDOCTRINATION

(Based on Those Troops Whose Attitudes Were Unfavorable at Baseline)


Percentage of men who no longer indicated anxiety, among men whose information gain was:
High (N = 57)
75%
Low (N = 55)
51%
Percentage of men who no longer indicated a belief that other troops were anxious, among men whose information gain was:
High (N = 70)
66%
Low (N = 59)
44%
Percentage of men who became confident, among men whose information gain was:
High (N = 49)
69%
Low (N = 35)
51%
Percentage of men who became willing to volunteer, among men whose information gain was:
High (N = 38)
50%
Low (N = 30)
27%

It appears from Figure III that in all four areas, attitude improvement was much more marked among men in the high-gain group than it was among men in the low-gain group. However, even among men who did not materially improve their information levels, attitude improvement was con-

[8] The average gain of the 101 men in the "high-gain" group was 6.0, and of the 89 men in the "low-gain" group, 1.2.

[9] Due to the small number of troops whose attitudes were less favorable at the post-indoctrination test than they had been at baseline, attitude deterioration was not analyzed.

siderable, as for example the 51 per cent of the low-gain group who no longer indicated anxiety about the bomb or the maneuver.

Individual Information Questions in Relation to Attitude Modification

Even though attitude improvement was shown to be related to troops' average gain on the information test, this analysis did not provide data on the relation of particular kinds of information to attitude change. The following analysis was designed, therefore, to examine the attitude-modifying effects of each of the 16 items in the test. In measuring attitude change, analysis was limited to the responses of men who, at their baseline test, responded unfavorably with respect to a particular attitude and incorrectly on a particular information question.[10] A change in attitude among these men was thus necessarily a favorable one.

The differences in attitude improvement among men who learned the correct answer to a question as compared to men who failed to learn the correct answer, are presented in Figure IV which shows for each of the 16 questions the proportion of "learners" and "non-learners" who improved on each of the four attitudes. In general, the longer the bar opposite a question, the more effective was that question as an attitude-modifier.

The same trends that were observed on the information test considered as a whole were also apparent on the individual questions in the test. On almost all of the 16 questions, attitude improvement was more marked among men who learned the correct answers than among men who did not.

The effectiveness of the individual information items ranged from some on which the attitudes of soldiers who learned the correct answers improved

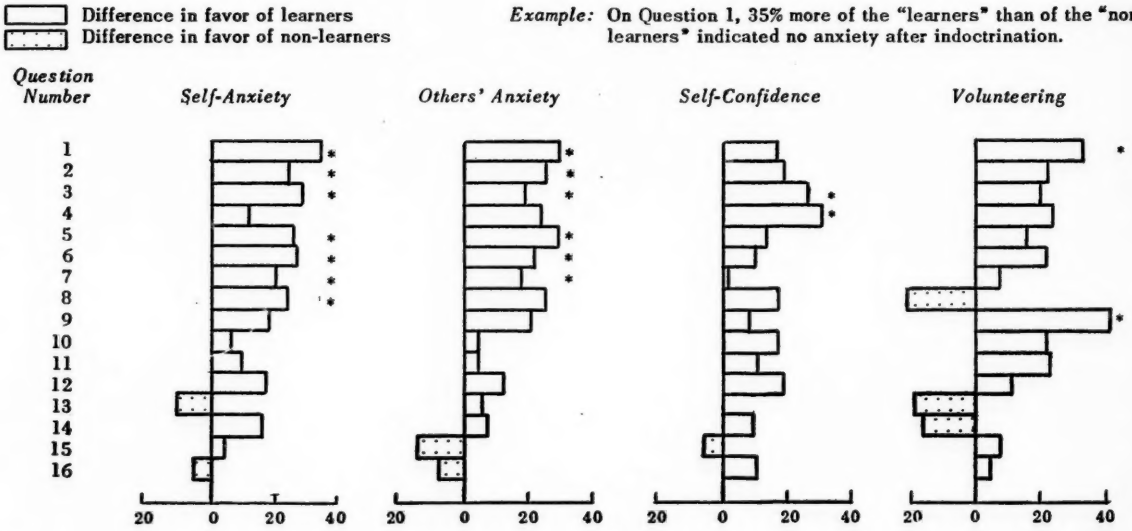
---

[10] The following are condensations of the 16 information questions asked in DESERT ROCK V:

1 Radiation from an A-bomb 1½ miles away does not result in permanent sterility.
2 An A-bomb air burst does not contaminate drinking water 1 mile away.
3 Children born in Japan now are not deformed because of the 1945 A-bombs.
4 Sexual potency is not reduced by an A-bomb explosion 4 miles away.
5 Geiger counters detect all dangerous radiation from an A-bomb.
6 Radiation is not contagious.
7 It is safe to walk through Ground Zero immediately after an A-bomb air burst.
8 Surface or underground bursts leave the most radiation at Ground Zero.
9 Radiation sickness is not always fatal.
10 Radioactive particles can be removed by washing with soap and water.
11 An A-bomb exploding at 2000 feet won't kill people by radioactive fall-out.
12 No ships had to be sunk after the 1946 Bikini tests.
13 It is not dangerous to move to Ground Zero 1 hour after an A-bomb tower shot.
14 Radiation from an A-bomb is imperceptible.
15 Radiation was not the chief cause of casualties in Japan.
16 Flash burns do not look like burns from radium.

FIGURE IV

PERCENTAGE-POINT DIFFERENCES IN ATTITUDE IMPROVEMENT BETWEEN LEARNERS AND NON-LEARNERS ON EACH OF 16 QUESTIONS,† BASELINE TO POST-INDOCTRINATION



†Question numbers refer to information items described in text.

*Difference significant, .95 level (t-test)

much more than those of soldiers who did not, to some few items on which the attitudes of learners did not improve as much as did the attitudes of non-learners.[11] For example, among men who learned that radiation from an A-bomb explosion would not result in permanent sterility of men in foxholes 1½ miles away (Question 1), attitude improvement was considerably more marked than among men who failed to acquire that knowledge. In contrast, soldiers who failed to learn that atomic flash burns resemble ordinary burns (Question 16) improved in their attitudes to about the same extent as men who learned this fact.

Although the reasons for these differences in the effectiveness of the various items of information could not be determined from the present data, it seems reasonable that the content of the items is a relevant factor. For example, learning facts about radiological hazards that might be encountered in the maneuver, or facts concerning the soldier's personal survival might reasonably be expected to have more effect on his attitudes than would facts about the technical processes of radiation.

Summary

The DESERT ROCK studies of troop participation in atomic maneuvers have demonstrated that indoctrination in atomic weapons and warfare can be effectively accomplished: the participant troops gained in information and improved in attitudes. Of information presented to the troops, that which had an intimate relation to the soldier's individual protection appeared to be most readily assimilated. Results obtained here suggest a marked relationship between information gained and changes in attitudes of confidence or anxiety toward participation in atomic maneuvers or warfare. Results are considered to offer suggestive hypotheses and implications for more general problems encountered in preparing civilian populations for exposure to disaster situations.

[11] This finding is discussed as if each fact were learned in isolation even though it is known that the effect on attitudes of learning any one of the 16 facts may depend on the particular combination of other facts that are learned at the same time. Detailed data on the possible effects of learning certain combinations of facts are not available in the present study, but an example of one such effect in relation to two facts is presented later in this section.

Anxiety in Response to the Unfamiliar[1]

Bradford B. Hudson

Introduction

A class of behavior that has been the subject of study by a number of investigators is the exploratory response aroused by objects or events in the environment, that are not immediately organized perceptually by the individual. The response is interesting, in view of its generality, for it has been noted as a behavior pattern in the rat, the chimpanzee, as well as in the human being. Further, it is a reaction which, it would appear, has survival value. It is a means by which the organism is alerted to changes or deviations from normal in its environment without, however, necessitating the organism's being constantly on the alert for such deviations. Sounds, physical objects or events, behavior patterns, etc. falling within the category of novel, in terms of the experience of the perceiver, tend to be spontaneously attended to.

Novelty has long been recognized as contributing to the formation of associations. Recently Woodworth(13) has dealt with the response to the strange or novel in terms of a motive to see and hear clearly. Response to the unfamiliar has been the subject of experimental study by Hudson(8,10) in the rat; by Hebb and Riesen(6), in the chimpanzee; by Hebb(4) in a theoretical analysis in terms of neurophysiological mechanisms; by Bruner (1) in his treatment of perceptual learning; and by Cantril(2) in terms of the attempts of the organism to come to terms with its environment, to achieve clarity.

In the interest of obtaining answers to some of the problems faced by those engaged in Civil Defense planning as well as for their theoretical interest several studies have been undertaken on the response of individuals and groups to events that are essentially outside the range of their experience. Since the studies are still in progress, the following is in the nature of a preliminary report of methods and results.

[1] These studies have been supported by research funds provided by the Rice Institute, The Office of Naval Research, and the National Research Council's Committee on Disaster Studies, from funds granted by the Army, Navy, and Air Force Medical Services. Contributing importantly to these studies have been John MacDavid, Marian Roco, Virginia Easley, and John Matlage at the Rice Institute, and Jeanette Raynor of the Committee on Disaster Studies, and Doctors Hoyt Lemons and Slaton Jenner of F.C.D.A.

Behavior in Response to a Situation Perceived as Threatening

In several studies conducted by the writer, a sound pattern, designed to lead to an interpretation of threat, was presented to groups varying in size from 15 to over 100. The subjects were exposed to a sequence of sound effects for a period of 25 minutes while attending lectures or meetings. The experiments began shortly after the start of a lecture with the sound, from a tape recording, of newsboys in the distance calling "Extra!" Minutes afterward there was the drone of a distant plane, followed shortly by fire sirens, and after intervals, more planes and more sirens, projected from loudspeakers placed outside the building. The development was gradual, building up, however, to a point where it was apparent that there was a considerable amount of both air and ground activity in progress. A moment before the end of the sound sequence a message was delivered to the lecturer by phone or note and this immediately followed by an air raid alarm and a flash accompanied by the sound of distant explosions. This terminated the experiment. Questionnaires were distributed to the audience and later followed up with interviews. Moving pictures, in some instances, have been taken.

Reactions to this situation are varied. A frequent interpretation among those who responded with anxiety was that possibly war had been declared by Russia. Both men and women in some cases have resorted to prayer, and tears have been admitted by a few of the latter. In one study a subject took shelter under a desk at the moment of the flash. Many, however, were only mildly disturbed and some not at all.

From the partial analysis of the data several trends are apparent: The situation is productive of a wide range of individual interpretations but very common in the individual is uncertainty, a confusion of hypotheses, as to the meaning of the events. In the individual's search for reliable cues the nominal leader, the speaker, however illogically, tends to be regarded as all-knowing and is a focus of attention. He is observed intently for evidence of anxiety and failure to show it contributes importantly to offsetting developing anxiety in the individual. His calm or apparent disinterest, in other words, is important as a source of reassurance. In contrast, however, as anxiety mounts in the individual his perception of anxiety in his own group increases. Thus, instead of reassurance, in projecting his own anxiety upon his fellows, he finds confirmation. Among 61 subjects the correlation between self-anxiety and anxiety perceived in the group as a whole was .63.

Anxious subjects will often perceive events in the environment as confirming or justifying their own anxiety, events that are objectively highly contradictory. The hilarious amusement of a group of students who were aware that they were the objects of an experiment did not interfere with the developing anxiety of persons in other sections in the lecture room. Instead, their uproarious behavior was perceived as evidence of their anxiety.

Inability on the part of an individual to arrive at an interpretation of the meaning of the events that is acceptable to him is significantly related to the arousal of anxiety: the more confused his hypothesis the greater his anxiety ($r = .48$: $N = 62$). Bruner(1) cites Bogoras, who reports that a Chukchee woman almost fainted on finding that he had brought a strange box into his host's house, objecting on the grounds of its strong and malevolent odor. However, instead of proposing that she behaved so because her hypothesis was that strange things smell bad, in terms of these data her emotional response would be thought of as a function of her having no hypothesis that would provide stability. Occasionally a subject, unable to identify feelings of anxiety as having occurred during the sequence of sounds, will report moist hands, or mild tremor at the end of the experiment.

Behavior in Response to an Ambiguous Stimulus

Focusing upon this factor of strangeness—employing stimuli, in other words, that are difficult to organize meaningfully—a series of studies in progress presents sounds that are free of any intended implication of threat. The procedure involves presenting to subjects in groups, so far limited to two, a not easily identified sound pattern while they are engaged in work on other tasks. Several runs have been made using a recording of the sound of horses trotting on pavement.

The reactions to this situation again have been varied, but frequent have been expressions of anxiety, from "What is that?" with overtones of alarm to "Maybe we'd better get out of here." Important, here, are the reports by these subjects of their hypothesis concerning this event during the thirty seconds of sound. These reveal no associations with past experiences clearly associated with threat. Rather they were of the nature "I thought of people hammering" or "It sounded like people clapping and stamping." But these, they stated, were not acceptable as explanations, and the stimulus remained perceptually unstructured.

The implications of these studies become more significant if we consider reports of animal behavior. Rats presented with unfamiliar objects in their normal living environment will respond initially with avoidance behavior. They will cautiously approach a strange object, then withdraw, and will attempt to cover it with anything loose in the cage(8); a young chimpanzee reared apart from others with no opportunity for "social conditioning" will show fear of snakes(12); chimpanzees raised with little contact with strangers will show fear of newcomers.(5)

Behavior in Response to Strange Combinations of Familiar Stimuli

A second type of stimulus has been employed in the laboratory situation, which consists of the strange combination of the familiar. Students, again

engaged in other work, were presented with the sound of a bench saw running in the adjoining shop. This was a common occurrence except for the fact that the lights were out, as could be seen through the half-glazed door. Since the shop was frequently dark, this was also a familiar situation. But to this unusual combination of the familiar, anxiety bordering on alarm may be evident.

In recounting hypotheses formulated and discarded in rapid succession, one student recalled none which carried any implication of threat. Another reported an illogical hypothesis, the content of which referred to the possible outcome that the saw might break loose and come crashing through the door. This appeared late in the sequence of hypotheses, following rather than arousing the anxiety. Other students exposed to this same situation have shown no reaction other than to note the onset, but misperceiving the source, attributed it to another section of the building.

Parallel with this response of humans to strange combinations of the familiar, again referring to animal studies, Hebb (5) has noted marked emotional behavior in the chimpanzee to unusual combinations of familiar stimuli: if two attendants with whom the animal is familiar exchange clothes this may provoke strong emotional responses, likewise if an animal is presented with a realistically painted plaster head of another chimpanzee, or with the body of an anaesthetized animal that fails to show normal responsiveness.

Associative Processes in Attempts at Recognition

The process of attempted recognition, described by subjects, of these unstructured stimuli appears to be by way of a series of associations. These may be general or specific. Specific experiences may have occurred years prior and may be as prosaic as a scene in a movie. Following the 15 to 30 seconds of sound, as many as 100 have been reported. Some are fleeting and recalled with difficulty. This high speed process appears almost at the same time to be checking and evaluating, rejecting or tentatively accepting the ideas, hypotheses or images as they emerge in a manner somewhat as described by Bruner. (1) All the while the individual is alert to the stimulus and at the same time closely observing the reaction of others.

In the experiments on response to threat the reports are similar although the amount of thoughts, images, etc., recalled during the 25 minute period is far less in proportion to the time. Instead of attempts at recognition of the sounds *per se,* since the sources of the sounds are clear, the content is concerned with explanations and implications and in some subjects with tentative plans based upon their interpretations; and again a search for reliable clues in the physical environment and in the behavior and expressions of others.

Adaptation to the Perceptually Unstructured

In addition to unstructured objects or events in the immediate present, as a stimulus for anxiety, situations may be presented symbolically that are temporally remote, which if outside the range of experience of the individual, may also arouse the response. But here another process intervenes, that of adaptation or learning.

The town of Pitcher, Oklahoma, as reported by the University of Oklahoma, is built on a site under which extensive mining operations have been carried on in the past. The ground is settling and it is expected that eventually cave-ins will occur of such proportions that there exists a serious threat to both the life and property of those still residing in the affected area. However, in spite of repeated warnings by mine officials, an appreciable number of residents in the town have refused to leave.

A similar situation was observed by the writer in the town of Miami, Oklahoma, during the period of the floods which inundated the Kansas City area in the summer of 1951.(11) For several days prior the town was warned of approaching flood waters. Fully two days in advance the United States Army Engineers indicated the level to which the water would rise in the town. In addition, they provided information hourly on the progress of high water as it approached the city. The emergency organization which had already been formed by the community provided a map for all to see on which was indicated exactly where the water would reach at the crest of the flood. However, in spite of warnings large numbers refused to move until the level of water in the river at the city had actually begun to rise. With that, the volume of requests for help in evacuating homes abruptly accelerated.

Either as an excuse for not responding to threats, a product of adaptation, or for allaying anxiety by stabilizing the perceived environment various rationalizations are invented as in Miami: "We wll stay put. The 1943 flood didn't get us and that was the worst in our history." In Hiroshima, as reported by Hersey (7), the population became accustomed to the frequent flights of American bombers over the city en route to other target areas. And for this likewise rationalizations were invented, "They won't bomb us. There are too many Americans here."

Situations implying a threat that lies in the future or the repetition of a stimulus carrying that implication arouses anxiety, but without reinforcements. This undergoes a progressive decline in intensity. This process of adaptation has been noted in animal studies. The fear of a strange object by rats declines steadily with repeated exposures, likewise the fear of strange objects in general if a series of different novel stimuli are presented over a period of time(9).

The Effect of Training Upon the Anxiety Response

A problem related to this discussion is the effect of the presence or absence of available behavior patterns upon anxiety. It has been reported that panic among troops subject to strafing by enemy aircraft during World War II was effectively reduced by instructing them to fire at the attacking plane with their guns or sidearms, this in spite of the fact that probabilities of that fire being effective were not large.

Numerous examples have been noted in field studies of disasters of the stabilizing effect of activity directed at administering first aid or carrying out other emergency functions. The emphasis upon training for emergencies, fire drills in schools and aboard ships, is in recognition of this principle. To what extent, however, is this anxiety reduction due to the action itself or a function of the cognitive organization provided by knowledge of action-to-be-taken in the situation? Troops in panic flight are taking action, yet the anxiety reaction, according to anecdotal accounts, is not appreciably reduced and may even be enhanced.

The answer is not immediately apparent. One point of view is that any stability in the present environment and one's place in it, whether it be narrow to include only a limited area of activity, or broad to include a clear perception of the total situation, aids in reducing anxiety. Children evacuated from London during the war, for a time at the cost of breaking up families, clung desperately to their dolls and teddy bears as the one structured element in their strange environment (3).

No doubt the emphasis upon training for meeting emergencies is correct, but possibly for reasons other than the development of behavior patterns *per se*. The training may provide some stability in a situation that is otherwise perceptually unstructured.

Concluding Comments

The accumulated evidence on the response to unfamiliar stimuli presents a rather consistent pattern. Adult animals, ranging from rats to humans, are sensitive to events, objects, etc., in their environment that are not immediately perceived as familiar. The response may be that of curiosity, consisting of focusing attention or exploration, or a series of associations with prior experiences, general and/or specific, in the process of partial or full recognition. The response may develop immediately into marked emotional behavior of flight, anger, excitement, or anxiety.

It is inferred that the stimulus whereby the organism is alerted to these deviations from normal is an internal one developing out of failure of recog-

nition. (See Hebb[5].) However , as noted earlier, rats exposed to a series of strange objects, though each is different from the others, respond with progressively less fear or curiosity, a generalized process of adaptation or learning. Secondly, it has been observed in rats and human subjects that a strange stimulus capable of arousing avoidance behavior or anxiety in a familiar environment may not elicit even mild curiosity if presented in an unfamiliar setting. It would be interesting to learn whether, in a community in which a major disaster has occurred, strangers suffer shock of the same intensity as residents of the area, other things being equal. The possibility exists that the impact of disaster is in part related to the problem under discussion, in the sense that destruction, creating the unfamiliar, if experienced in the context of a familiar environment is a contributing factor to the arousal of anxiety and to other disorganization of behavior.

Both the response to the perception of threat and to unstructured environmental stimuli have been discussed. They may not be wholly equivalent. However, threat exists in the perceiver, not in the object, and one characteristic of the perceptual organization of events perceived as threatening is ambiguity, in this case, of outcome. Ambiguity or lack of perceptual organization is therefore common to both. Although the threat of an imminent air raid arouses hypotheses concerning possible involvement of self, relatives, property, etc., these also to a significant extent are adapted to in a manner at least superficially comparable to the adaptation to unstructured environmental stimuli.

As noted earlier, in addition to threats that are perceived in the immediate present, there are those which are temporarily remote. Here, however, appropriate action is likely to be postponed. In the towns of Pitcher and Miami, Oklahoma, the populations responded initially to prediction of disaster with anxiety but adapted to the threat to a point where appropriate behavior became difficult to elicit. For civil defense these processes of adaptation and rationalization make the conduct of a program difficult. To expect that a population will continue to respond to appeals for the support that initially was motivated by anxiety seems contrary to evidence. Support may be elicited on the basis of intellectual appeals, but that dynamic force that stirs a population to action in the face of threat rapidly declines in the absence of reinforcement. These processes are inevitable and should be recognized as such. They are the result of learning processes that successfully reduce anxiety.

REFERENCES

1. Bruner, J. S., "Personality dynamics and the process of perceiving," in Blake, R., and Ramsey, G. V., *Perception: An Approach to Personality.* New York: Ronald Press, 1951.
2. Cantril, H., *The "Why" of Man's Experience.* New York: The MacMillan Company, 1950.

3. Freud, Anna, *War and Children.* New York: Ernst Willard, 1943.
4. Hebb, D. O., "On the nature of fear," *Psychol. Rev.,* 1946, *53,* 259-276.
5. Hebb, D. O., *The Organization of Behavior.* New York: John Wiley and Sons, 1949.
6. Hebb, D. O., & Riesen, A. H., "The genesis of irrational fears," *Bull. Can. Psychol. Assoc.,* 1943, *3,* 49-50.
7. Hersey, John, *Hiroshima.* New York: Alfred A. Knopf, 1946.
8. Hudson, B. B., "Avoidance behavior of rats at various age levels," *Psychol. Bull.,* 1940, *37,* 431. (*Abst.*)
9. ———, "Extinction of the avoidance behavior of rats to strange objects," *Psychol. Bull.,* 1940, *37,* 591 (*Abst.*).
10. ———, "One-trial learning in the domestic rat," *Genet. Psychol. Monog.,* 1950, *41,* 99-145.
11. ———, *Observations in a community during a flood.* Prepared under Navy Contract No. 490 (01).
12. McCulloch, T. L., and Heslerud, G. M., "Affective responses of an infant chimpanzee reared in isolation from its kind," *Jr. Comp. Psychol.,* 1939, *28,* 437-445.
13. Woodworth, R. S., "Reinforcement of perception," *Amer. Jr. Psychol.,* 1947, *60,* 119-124.

Gaps and Goals in Disaster Research[1]

John W. Powell

Current Status of Disaster Research

As has been suggested, American urgency about disaster study grows out of our uncertainty about how we will act if war is ever brought directly into our continent: modern war, especially atomic war. Our anxiety over our own prospective performance is, I think, demonstrated by the spotty and perhaps guilt-motivated concentration on disasters approximating atomic explosion. (If we had dropped nerve gas or a virulent toxin on Japan, what would our focus of study be now?)

As all of us know, both defense and disaster studies cover a wide map within which explosive disasters form only a segment, and disaster management only one of many possible dimensions. It might be useful to lay out, if we could, the full map, or perhaps globe, of needed research.

We already know that several levels of inclusiveness must be taken into account in the study of any disaster. The outermost level is sociological, the cultural anthropology and demography of the region in which it occurred, the ruling patterns of response to life, property, authority, the gradients of prestige and security between sub-groups: some lives were lost in the poison-liquor incident in Atlanta in 1951 because of the Negro-white gradient and its behavioral expressions, and not just because of poisoned bootleg.

Focusing down, we know how important is the *group* structure within a disaster population; their capacity to work as, or to form, groups, and the effects of group identification in individual survival. The individual, in his relationships, his roles, is another level of observation. Within him, we must focus down further onto needs, dynamic processes, perceptual responses, autonomic nervous reactions. Actually, we should not stop short of integrating the molecular level as well, the neurophysics and electrochemistry of the nerve cell.

Each level of understanding is a necessary adjunct to the understanding of any other. This we know. What we do *not* know is how much work is

[1] This is a condensation of a paper presented at a recent planning session of the N.R.C. Committee on Disaster Studies.

being done, or needs to be done, both at the different levels and in their integration into a balanced and comprehensible whole. One major dimension on our map, therefore, is that which runs from the neurological through the behavioral to the social sciences.

We have taken too much for granted, I think, not only the explosive disaster as the matrix of study, but the Eastern Seaboard as the model of a populated area. If this is exaggerated, it is still true that most of our attention has been to urban areas. Yet rural areas might become not only evacuation goals, but impact areas for bacterial attack; and there is not *one* rural area, there are many.

Consider the regional differences, on our own seaboard, between New England, Middle Atlantic, and Southeastern states—all of them highly concentrated in population. Then take the northern, central, and southern Middle West, with different populations differently diffused. Add the Southwest, and the southern and northern Pacific Coasts. And easiest of all to overlook is a totally alien land, the dry-farming areas of the Great Plains, with their thin scattering of remote farms, their preference for decentralization and mobility.

Look at it again in terms of resources: wheat, cattle, cotton, fruit; fishing shores; extractive centers; lake ports. Each imposes differences in important patterns of living, of response to the stress imposed by drought, storm, disease, loss of markets.

The horizontal projection of our map should, then, include regional cultures and specific resource areas, with study of their responses to threats that may approximate various weapon choices. Their real response to immigration from stressed areas needs closer study, too; their actual dependence on city-centered technologies of communication, transportation, and supply; and the historic tendency of countrymen, when beleaguered by nature's weapons, to turn toward the cities.

Knowledge about all these factors exists, just as knowledge on the different levels of intra- and interpersonal functioning exists. The reason we need a map that takes them all in is so that we, in thinking about disaster study, can see every part in perspective and in relation to the whole terrain. Furthermore, we need to be aware of the possible significance for disaster research of studies which may have been done in other contexts. What have been the patterns of emigration from stressed areas—of drought and dust, of unemployment and hardship? What sorts of people go where, fleeing from what threats, to what goals? Security with relatives? Opportunity in high-employment areas? Self-help in open country areas? We know of studies in defense-boom towns that suffered disasters of mass immigration with inade-

quate housing, plumbing, transportation, medical, educational, or security resources. Those studies too belong on our map, and with some priority.

Finally, our map must have room to balance disasters of varying types: epidemics, droughts, and serial shocks, the stress of prolonged and cumulative dread, to supplement our new data on sudden violence and its effects.

Over-all, the status of disaster research is probably strong; but it is unrecognizable at present because every project is called something else. Of all the functions this Committee could perform, probably the most important would be that of finding out what is going on that is of interest to us, and of alerting those who are making these unlabeled studies to their importance for our concerns.

Possible Areas for Exploratory Study

I come now to suggestions for research. Among the most important ones, in my regard, are the study of training factors in determining role-choice and goal-persistence among rescue and remedial workers in disasters; and the study of space-time distortions of perception in situations of urgency where the objective factors could be quantitatively determined. The first of these has obvious utility for training programs such as Civilian Defense and Red Cross. The other might easily be hooked on to laboratory studies already being carried on in universities. A third, the study of the timing of incidence of disaster-related overloads on medical personnel and facilities, in disasters of different types, might interest the Medical Committee, or even the AMA.

The greatest confusion that has shown up in the three years' studies has been in *methodology*. This has four parts: field management; data gathering; data assessment; and study design.

1. Every field worker or team has had varied experiences in getting received, identified, and sponsored in the communities under study. Upper-echelon clearance meets respondent suspicion and resistance. Attorneys instruct clients to refuse interviews pending insurance or damage claims. Industrial firms refuse access, fearing damage to reputation; victims refuse information, fearing the interviewer is working under cover for the company. Every sponsor's sphere of influence, be it university, hospital, Civil Defense, Red Cross, mayor, or police, has its limits, beyond which lies resistance to that sponsor. Is there any way to improve our management at this point?

2. Interviewers have been many, schedules diverse, and emphases have differed from team to team, from episode to episode. Each interviewer has had his own needs and interests and avoidances; every respondent his motivations and needs and areas of avoidance. Data-gathering has ranged from open-ended interview to questionnaire, from survivors' accounts to newspaper stories. And most of the interviews have been single-shot, with no chance to follow up either in longitude or in depth, or to re-visit after a stated period.

Even the choices of disasters to be studied have been hurried, often influenced, if not dictated, by the front pages. Since no sudden violence is predictable, time has had to

elapse while team and sponsor conferred, while reservations were obtained and travel money milked from the appropriate office.

Some interviews are recorded; of these, some are difficult to hear. Some are taken down in pencil notes; some, remembered and recountered afterward.

We do not yet know the most consistently reliable interview forms, or interviewer personality, or recording method. Is there any way to improve our tools at this point?

3. The data we now have, are "raw" in nearly every sense. There is urgent need for some consensus on a *gradient of data reliability,* along which given items in our interviews could be *scored* as high, probable, moderate, or low reliability data, or as rumors, guesses, and unreliable data. Criteria could include the context of the statement (whether volunteered or suggested, for example), its internal consistency within the interview and its consistency with other respondents' statements, about the same situation or the same *kind* of situation; evidence of motivation in the respondent, or the interviewer, tending to make the statement more or less congruent with reality. Time after the experience described; presence of other listeners—these and many more that we all know of are factors to be taken into account. The goal is the ability to say, "This is strongly supported by high-reliability data, while this other is suggested by data of moderate reliability." Is there any way to advance our own reliability nearer to this goal?

4. Field study design, population choice and sampling, are examples of research standards, very difficult to apply in disaster sites. Could the Committee, however, at least decide in advance, "The next time a polio epidemic breaks out in a small urban area, we will interview at these intervals, this many subjects, with these kinds of involvement, to get as much data as we can on *that?*"

I have long felt that two needs of the disaster population, including ourselves, could be met by a single instrument: a mental health team, composed as usual of a psychiatrist, psychiatric social worker, a psychologist, and a disaster research specialist, who would enter the area as soon as possible and remain in it for, say, three months; or revisit it monthly for a year.

The first need is *mental health first aid* followed by continuing remedial care for the emotionally disturbed, diagnostic service, help in carrying through from rescue into recovery. The second need is the accumulation of adequate data, in depth and over some period of time, on the disturbances arising from various kinds of disaster. In the average clinic, research does not sit easily with therapy. The need for control cases, for example, is resisted by the doctor's impulses for therapy. In disaster sites, I think the goal would be data accumulation, rather than deliberate segregation of controls; so the conflict should not arise.

I have tried, and not succeeded, to use the group-therapy context as a joint help-giving and data-gathering device. The difficulties I encountered are themselves worth study; but so is the device itself.

Finally, I think a real purpose could be served by the Committee in an editorial function, helping to prepare and publish for popular, not only professional, reading some of the results we have achieved thus far. Wider readership for more reliable, in place of sensational novelistic projections and other less reliable, descriptions of how we act under stress might rebound to further the interest in disaster research itself.

Summary

In view of the wide range of research needed, and actually in process, as contrasted with the relatively specialized interests thus far identified as "disaster research", I have here tried to suggest:

1. That a comprehensive map of our chosen field of concern be drawn, to include the different behavioral disciplines and their sub-strate and super-strate levels of scientific study; and to include the full range of regional and resource-centered cultures, their ecology and demography and their probable response to local impact, natural or wartime.

2. That the Committee interest itself in what others are doing that bears on our concerns, and interest others in their relationship to our research; including other Committees of the Council, other professional bodies, Federal agencies, foundations, etc. I know this is already being done; I only suggest it might be done in a more complete and balanced way if these efforts are related to the "map"; and some orphan projects might find adoption.

3. That the Committee set up means to work out an improved methodology of field management, data gathering, and data evaluation.

4. That the Committee consider the proposal for mental health field teams for use in disaster sites, and other ways of combining urgently needed therapeutic assistance with data collection.

5. That the Committee consider assisting in publishing, for popular information, what reliable impressions have been assembled through systematic search, to replace the misleading and often dangerous folklore about "panic", "hysteria", "mobs", and other projections of our distrust of ourselves and of our people.

Some Accomplishments and Some Needs in Disaster Study

Lewis M. Killian

When one considers the many questions about human behavior in disasters which remain unanswered, there is a temptation to view what we do know as being very little. But if we think for a moment of the picture which presented itself to us back in 1950 when, I believe, systematic disaster research began in this country, we find assurance that we have learned much. At that time, about the only empirical, scientific study of a disaster to which we could refer was the Halifax study by Prince. For treatments of the subject, we could look to L. J. Carr, Sorokin, and LaPiere's brief discussion of panic.

True, there was a vast body of literature which Wallace has characterized as being either "popular" or "scholarly", but this literature presented a rather incoherent, sketchy, and sometimes patently unreliable picture of disaster behavior.[1] In 1953, NORC reported that they had compiled a bibliography of over 2,000 titles, but that the whole compilation was singularly unproductive of useable ideas. I am sure that many of you were surprised, as was I when I started doing field studies of disaster, to discover how fanciful and inaccurate are the accounts of disaster found in most non-scientific writings.

It follows that a basic gain has been made in bringing the study of human behavior in disaster squarely within the domain of the sciences, social, biological and physical. It is a notable accomplishment that a significant number of social scientists have found this field of study both attractive and profitable. Wallace has aptly pointed out that disasters have not fallen readily into the *Weltanschauung* of the behavioral sciences because of their uniqueness as events and their limited amenability to currently popular techniques of research.[2]

It is also encouraging that so many scientists have seen fit to undertake research in an area in which the demand for immediately applicable results is so urgent. We in disaster research certainly are not among those scientists described by Louis Wirth as being interested only in problems "uncontami-

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[1] A. F. C. Wallace, "Human behavior in extreme situations," report to Committee on Disaster Studies, National Research Council, National Academy of Sciences, February 2, 1954.

[2] *Ibid.*

nated by any relationship to reality". Yet it is a strength of disaster study that researchers have been quick to see the basic theoretical implications of their findings and the contributions which disaster research can make to broader areas of theory. Equally desirable has been the persistent attempt to relate disaster findings to existing theory in such areas as perception, learning, stress, reference groups and social organization.

As a result of efforts undertaken in this spirit a small but significant body of findings which we may designate "disaster theory" has been developed to replace the mass of lay writings on disaster. If he can only find the material, still scattered under many covers as it is, the scientist coming into the field of disaster study today need not begin his research "cold", with no orientation to theoretical and practical problems.

Achievements of Disaster Research

An important aspect of this orientation is the elimination of several erroneous notions about disaster, based on popular misconceptions. We have learned of the fallacy of uncritical, vague and too generous use of the term "panic" in describing disaster behavior. The relative infrequency of gross psychological disturbances and of anti-social behavior has become evident. Uncritical acceptance of reports of the smooth and efficient functioning of pre-existing organizations and formal leaders is checked by sensitivity to malfunctionings and conflicts of organization, the not infrequent failure of formal leadership, and the importance of the emergent leader and the spontaneous, informal group in disaster.

Positive findings are of more interest, however, than are cautions against misleading assumptions. Our findings must still be regarded, by and large, as hypotheses. The claim for their validity still rests on the consensus of various researchers and not upon the results of rigorous testing.

While a precise definition of the concept, "disaster", is yet to be formulated, there seems to be consensus as to the essential nature of the phenomenon and as to its salient dimensions. Basically, any disaster involves a disruption of the social context in which the individual functions. Deaths, injuries, destruction of property and disruption of communications all acquire importance principally as departures from the pattern of normal expectations upon which the individual builds up his actions from minute to minute. The central problem for research becomes, "What factors produce what degrees of disruption in this social context, and how do individuals and groups behave in the face of this disruption?"

The variety of types of disasters has been recognized. These types have been identified with a fair degree of precision, but intensive research has been done on only a few types. Research has been concentrated chiefly on disasters

characterized by sudden, physically violent impact, with a brief period of warning or no warning at all. A few studies have been done of disasters with relatively long pre-impact periods, such as floods and hurricanes.

Out of this research has developed consensus as to the spatial and temporal dimensions of disaster. Wallace has defined the following spatial zones: impact; filter; organized community aid; and organized outside aid.[3] Powell and Rayner have offered a scheme for the classification of time stages.[4] To the extent that there is agreement as to the validity and heuristic value of these schemes, there is a definite advance from the practice of each researcher's using his own idiosyncratic schemes.

Findings and Hypotheses

Substantive propositions concerning individual and group reactions are largely of a general nature and need much refinement. We know, for example, some of the important factors which affect individual perception of threat, although we need to know more about just what their effects are. These factors include: previous experience with disasters of the type which threatens; the nature of this experience (whether involving a near-miss or a remote-miss); the nature of the warnings—authoritative or permissive, ambiguous or unequivocal; the response of other people to cues indicative of threat; and the habituation of the individual to such cues.

Much has been learned about individual behavioral and emotional responses to impact. Under the rubric, "initial responses", the following propositions may be advanced:

(1) Initially the individual tends to interpret perceptual cues related to disaster in terms of his apperceptive mass, deciding what has happened on the basis of what he thinks might happen in this situation.

(2) Personally disorganized behavior, particularly panic, is not typically modal but occurs under special conditions. Two such conditions are ambiguity as to the possibility of escape, and pre-existing definitions of the situation as "panic-producing".

(3) Structuring activity, often giving the appearance of disorganized personal behavior, is typically a modal response in all zones early in the post-impact period. Many of the problems of social disorganization, such as the movement of large numbers of people towards the impact zone, stem from this tendency to engage in structuring activity.

(4) Much initial behavior, both adaptive and maladaptive, is of a non-rational, reflexive nature.

(5) The disaster syndrome, usually characterized as a state of "apathy" or "shock" affects a large number of persons, particularly in the impact area, and presents both problems and possibilities for social control of survivors.

(6) Severe emotional disturbances are relatively infrequent in disasters, but psychosomatic after-effects are almost universal.

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[3] *Ibid.*

[4] J. W. Powell and J. Rayner, "Progress Notes: Disaster Investigation" (Chemical Corps Medical Laboratories, Army Chemical Center, 1952).

The importance of social roles as determinants of disaster behavior has come to be recognized. The possession by the individual of a clear conception of a role which he can or should play seems to be conducive to organized, adaptive behavior. At the same time, role-conflict contributes to personal disorganization, anxiety and failure to act in a community-oriented manner.

Analysis of leadership in disasters has led to recognition of the predominant importance of situational factors in this type of leadership behavior. The appearance of the emergent leader in the early stages of disaster is a frequent and significant phenomenon. It has also been found that when formal leaders fail to function in a leadership capacity in early stages they still tend to reassert their authority and attempt to reestablish their prestige in later stages.

Certain propositions may also be advanced concerning behavior on the group level. A sequence of group behavior has been identified, marked by the frequency and significance of spontaneous group formation and activity in the inventory phase of the post-impact period and the taking over of functions by institutionalized agencies later. It has also been found that group disorganization is not necessarily indicative of widespread personal disorganization, as is often assumed.

The importance of the effects of the actions of others on the individual's response has been recognized, although the exact nature of these effects needs to be spelled out. In the study of the reactions of children to disaster, a significant reciprocal relationship between the presence and the actions of children and adults has been found to exist. Among adults, the "codes" of established, self-conscious groups, such as fire companies, are important in sustaining morale.

Also on the group level, separation of individuals from other members of the primary group is important as affecting the psychological impact of the disaster, anxiety reactions and uncontrolled forms of behavior, and the extent and nature of communicative activity. Iklé has explored the implications of such separation for evacuation behavior, showing that it is an important obstacle to evacuation.[5]

Some of the most important findings relate to the activities of organized groups, or agencies, particularly those from the Zone of Organized Outside Aid. In any but very small disasters, organized outside agencies have a greater potential of effectiveness than do local groups because of the lack of intense involvement of their personnel in the disaster and because their organizations and supply bases are intact. Obstacles to the realization of this potential include:

[5] Fred C. Iklé, "The social versus the physical effects from nuclear bombing," *The Scientific Monthly*, 1954, *78*, 182-187.

(1) Inadequate reconnaissance.
(2) Interagency jealousy,
(3) Poor interagency communication.
(4) The cycle of local reaction to outside aid, from initial dependency to later hostility.

In this connection, one of the most important findings is that in different time stages survivors are receptive to different types of aid and treatment.

It is evident that almost every proposition which I have mentioned as a *finding* constitutes the basis of several hypotheses for further research. We now have developed several conceptual schemes for the analysis of disaster in its different dimensions; causative agent; spatial extent; temporal duration and stages; types of emotional response; levels of overt behavior; and degree of threat involvement and loss involvement. Although it has been suggested before, the task still remains of organizing the data we have at hand in terms of these conceptual devices. This should lead to a more precise, less impressionistic overview of what we do know about disaster behavior. At the same time, it should define more clearly the *lacunae* and the inconsistencies in disaster theory.

We will find that many of our findings are still only hypotheses in need of rigorous testing. At the same time, the practical reasons for disaster research demand a constant exploration of new areas.

Directions for Further Research

Although a fairly clear picture of the sequence of individual and group behavior in disaster has emerged, this is a general picture. It is a picture of the responses of a population treated as if it were homogeneous except for sex, age and role differences. The heterogenity of the American population indicates the need for attention to group differences in response—ethnic, religious, class, urban-rural and regional. Careful selection of cases for field study should provide data indicative of the existence or absence of such differences. This would constitute essentially a study of cultural pre-conditioning in the pre-emergency period, a period which has been largely neglected heretofore.

Other factors existing in the pre-emergency period which might be made the focus of attention are differences in the social organization of disaster-affected communities as related to recovery. Variables would include the formal structure of authority, the informal power structure, and the relationship of groups within the community. For instance, in the Warner Robins situation some of the difficulties encountered by the Red Cross seemed to stem from a status struggle which went on between the Macon Chapter and certain other local organizations in the pre-emergency period. In one of the Oklahoma tornado towns a political cleavage in the community definitely

affected reorganization and recovery, as well as the work of outside agencies. Identification of the structural forms which affect recovery in different ways might have a very practical application for the Federal Civil Defense Agency in helping to foresee the problems which might arise in particular communities.

The pre-impact period might also be explored more intensively. It may be observed that, as a nation, we are now in the generalized warning phase of the pre-impact period. In various ways, people are responding to this generalized warning. While we do not know what is the most adaptive type of response, the Federal Civil Defense Agency has to assume that certain responses are desirable. A problem for research, therefore, is, "What makes people respond, or not respond, in the way that FCDA believes desirable?" There are civil defense organizations in many of our communities. The Michigan studies showed in 1951 and 1952 the existence of a "general sentiment for civil defense". In some communities this general sentiment is paralleled by action. A number of questions may be asked about local civil defense organizations and programs, the answers to which would be indicative of how and why a "grass-roots" civil defense program gets started and suggestive of the potential effectiveness of the organization if called upon to function in a disaster. Some of these questions are:

Who are the leaders, and how did they get their position?

Who are the adherents, "the followers"? What are their skills, their other roles, and what segments of the total population do they represent?

What are the motivations of the leaders and the adherents? What functions does civil defense activity fulfill for them?

What is the orientation of civil defense participants to non-participants, and vice-versa?

What are these organizations like as groups, with respect to structure, morale, esprit de corps, ideology, norms, and tactical plans?

Some of these local organizations have training programs in progress. The reactions of individuals to training for disaster are important data, even in the absence of the ultimate realistic test of the effectiveness of this training. We may ask, "What do people acquire in the way of information and skills from the type of civil defense training which is going on? Through what media are they reached and reached most effectively? What emotional reactions do various types of training evoke? What attitudes towards the whole subject of civil defense?" It seems to me that school training programs are especially suitable for research on this subject.

Another time period which has been neglected is the post-emergency period which, for some communities, has proved to be also the pre-emergency period for the next disaster. In the past five years many disaster-stricken communities have been studied. Perhaps the time has come for

follow-up studies of both individual and group recovery and readjustment. This might include studies of the persistence of emotional disturbances; of changes in the perception of threat and reaction to threat, particularly in areas where tornadoes have struck more than once. On the group level, research may focus on changes in social organization which may be related to disasters. An important question is whether experiencing a disaster does actually impel a community to make preparations for another and, if so, what is the process through which such preparations come to be made. There is also the important question of the effects of disaster experience on attitudes towards disaster agencies.

At our last conference of this sort, the problems of research on evacuation of the American population were discussed. Since then, a beginning has been made towards the study of evacuation behavior in American communities. More studies could be made of the effectiveness of various types of evacuation advice or orders, delivered through various media; of the factors affecting individual decisions to evacuate or not evacuate; and of attitudes towards authorities advising or ordering evacuation, particularly when the predicted danger does not materialize. Research could also be undertaken to provide an estimate of the number and types of evacuees who might be expected from target cities and of the ability of reception areas to absorb them.

Finally, careful consideration should be given to the possibility of conducting experimental, even laboratory, studies of individual and small group reactions to stressful and ambiguous situations. Perception, emotions, leadership, personal and group disorganization, and the effects of fear, training, and organization on behavior are among the variables which might conceivably be subjected to this type of research. It may be that some of our generalizations about disaster behavior can be rigorously tested only by the development of such methods.

The Contributors

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